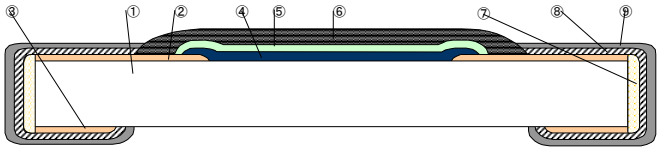
Issue date : April 10, 2023

Non-containing evidence report of Environmental impact substance

Products Name: Thick Film Chip Resistors
Part Number: ERJ2GEJ#@#@X

Company Name : Panasonic Industry Co.,Ltd.
Department Name : Resistor and Sensor Business Unit,Device Solutions Business Division
Responsible : Hideki Tanaka,Manager,Engineering Planning Section



Part No.	Part name	Composition material name / Part number	Analysis facilities	Analysis date	Evidence No.	Cadmium		Lead		Hexavalent chromium		Mercury		Polybrominated biphenyls (PBB)		Polybrominated diphenyl ethers (PBDE)		Bis(2-ethylhexyl) Phthalate (DEHP)		Butyl Benzyl Phthalate (BBP)		Dibutyl Phthalate (DBP)		Diisobutyl Phthalate (DIBP)		Reason in case of containing the substance	Remarks
						Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method	Analysis result	Analysis method		
1	substrate	Alumina 96	NAITOH	Feb. 7,2023	J-51	<0.5	ICP-OES	<2	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS										Ceramic abbreviation
2	top terminal	Ag/Pd	NAITOH	Jan.19, 2023	J-32-4	<0.5	ICP-OES	3800	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS									RoHS Exemption	Metal abbreviation
3	bottom terminal	Ag	NAITOH	Jan.19, 2023	J-32-3	<0.5	ICP-OES	3700	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS									RoHS Exemption	Metal abbreviation
4	Resistive element	RuO2	NAITOH	Jan.19, 2023	J-32-7	<0.5	ICP-OES	46000	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS									RoHS Exemption	Glass abbreviation
5	First protective coating	Flint Glass	NAITOH	Jan.19, 2023	J-32-9	<0.5	ICP-OES	250000	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS									RoHS Exemption	Glass abbreviation
6	Second protective coating	Epoxy Resin	NAITOH	Apr. 4, 2023	J-58	<0.5	ICP-OES	<2	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS	<50	GC/MS	<50	GC/MS	<50	GC/MS	<50	GC/MS		
7	side terminal	Ag-Epoxy	NAITOH	May.6, 2022	J-59-2	<0.5	ICP-OES	<2	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS	<50	GC/MS	<50	GC/MS	<50	GC/MS	<50	GC/MS		
8	middle terminal	Ni	NAITOH	Feb. 7,2023	J-23	<0.5	ICP-OES	<2	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS										Metal abbreviation
9	outer terminal	Sn	NAITOH	Apr. 4, 2023	J-21	<0.5	ICP-OES	<2	ICP-OES	<2	UV-VIS	<0.2	AAS	<5	GC/MS	<5	GC/MS										Metal abbreviation

(Notes 1) Content of the total Chromium (However, if the content of the total Chromium exceeds the standard value, Hexavalent chromium will be remeasured.)

Unit : ppm

(Notes 2) Content of the total Bromine (However, if the content of the total Bromine exceeds the standard value, PBB and PBDE will be remeasured.)

(Notes 3) Unit; μg/cm2

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The Knights

J-51

(No. 221219-10273-1)
Date :February 8, 2023

Test Report

Client Name : Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address : 401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name : Product J-51
Item/Serial number : J-51
Test object : Product/Material Test
Testing period : December 20,2022 to February 7,2023
Sample collection method : Bring-in
Additional information :

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Lead(Pb)	N.D.	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	February 7, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	February 7, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	February 7, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe
Environmental Certified public Measurers
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Mari Sanada デジタル署名者：Mari Sanada 付：2023.02.08 16:03:58 +09'00'

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The Knights

Test Report

(No. 221219-10273-1)
Date :February 8, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	February 7, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	February 7, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

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The Knights

(No.221219-10273-1)
Date:February 8,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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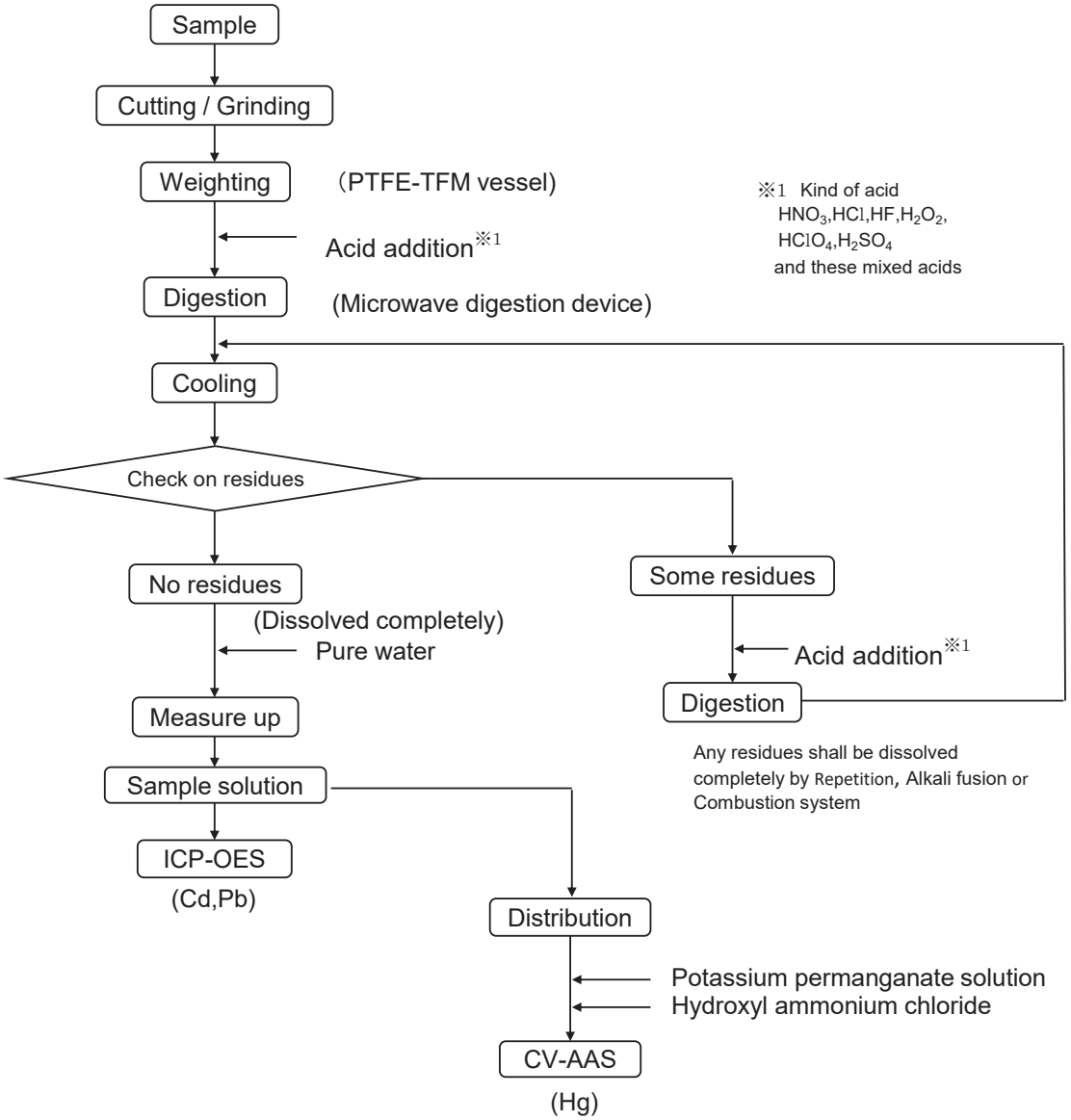
The Knights

(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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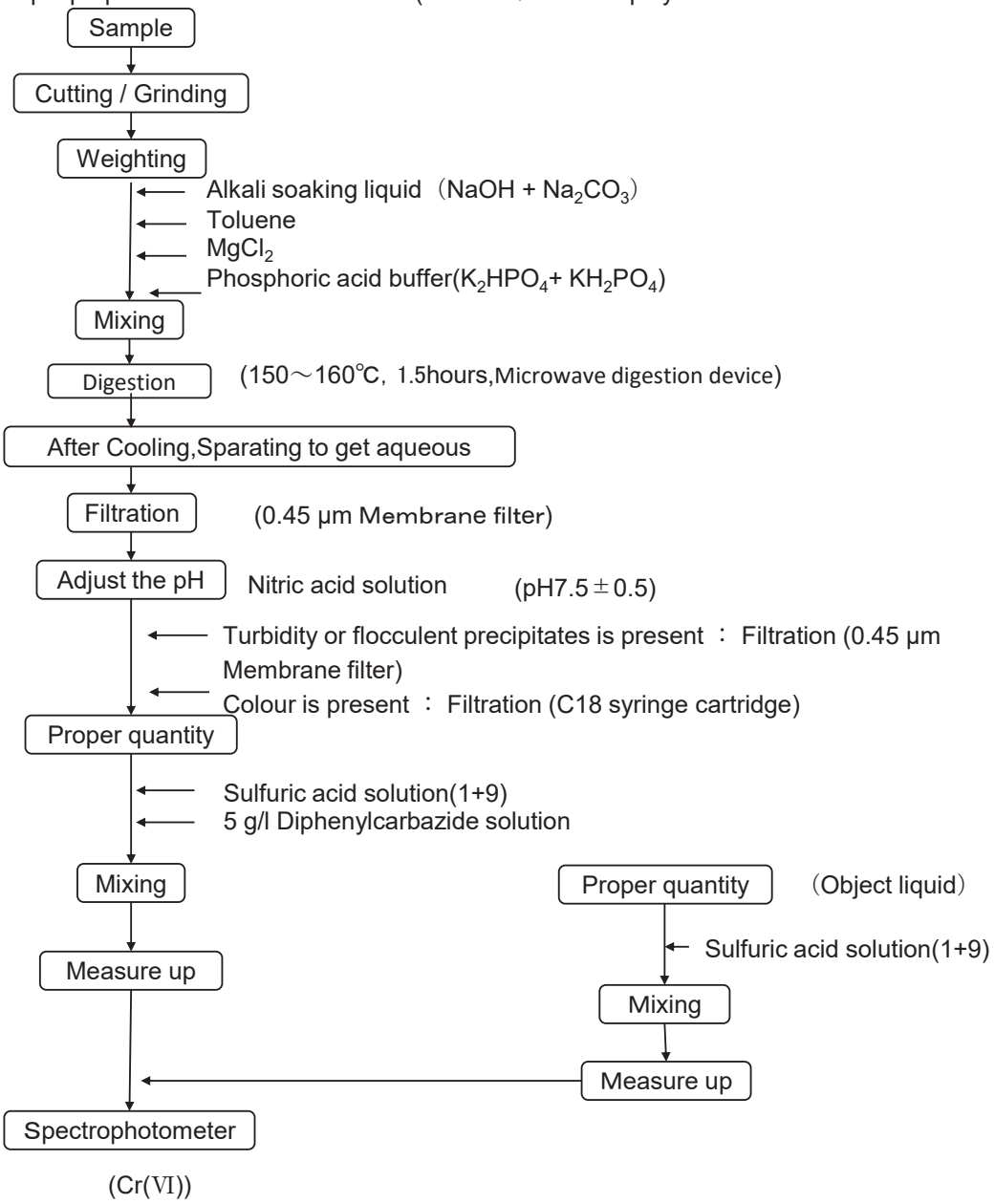
The Knights

(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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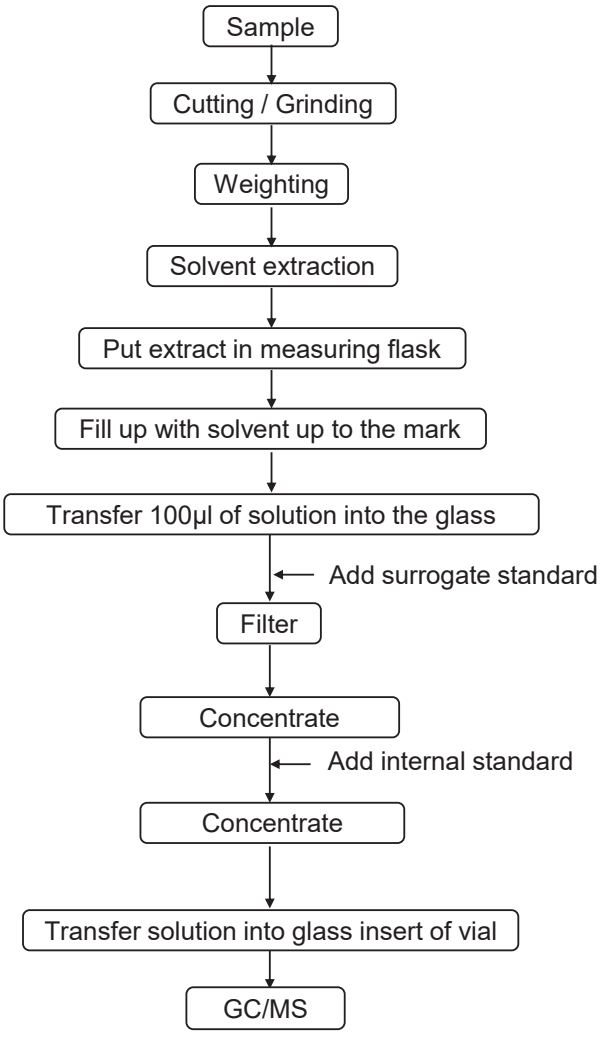
The Knights

(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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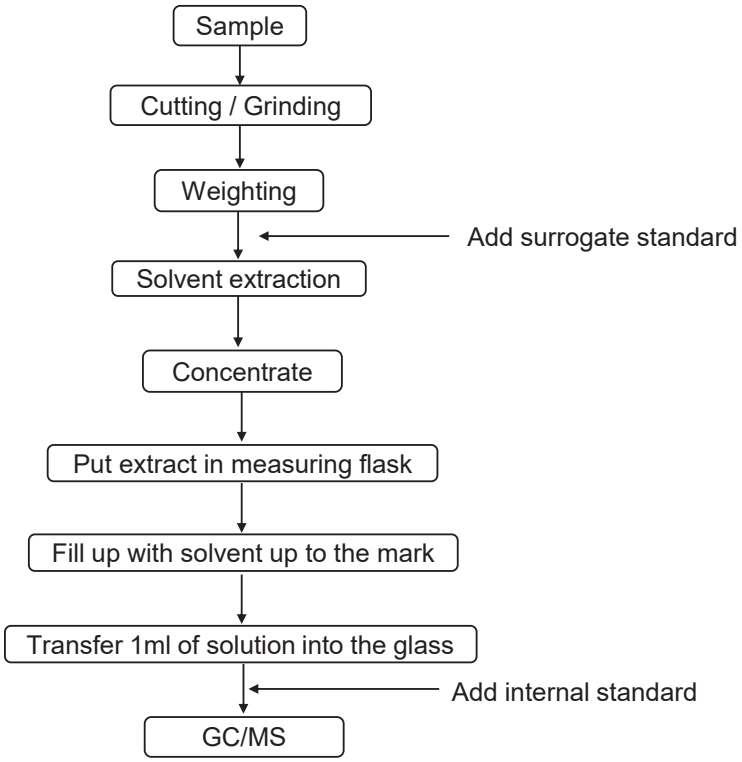
The Knights

(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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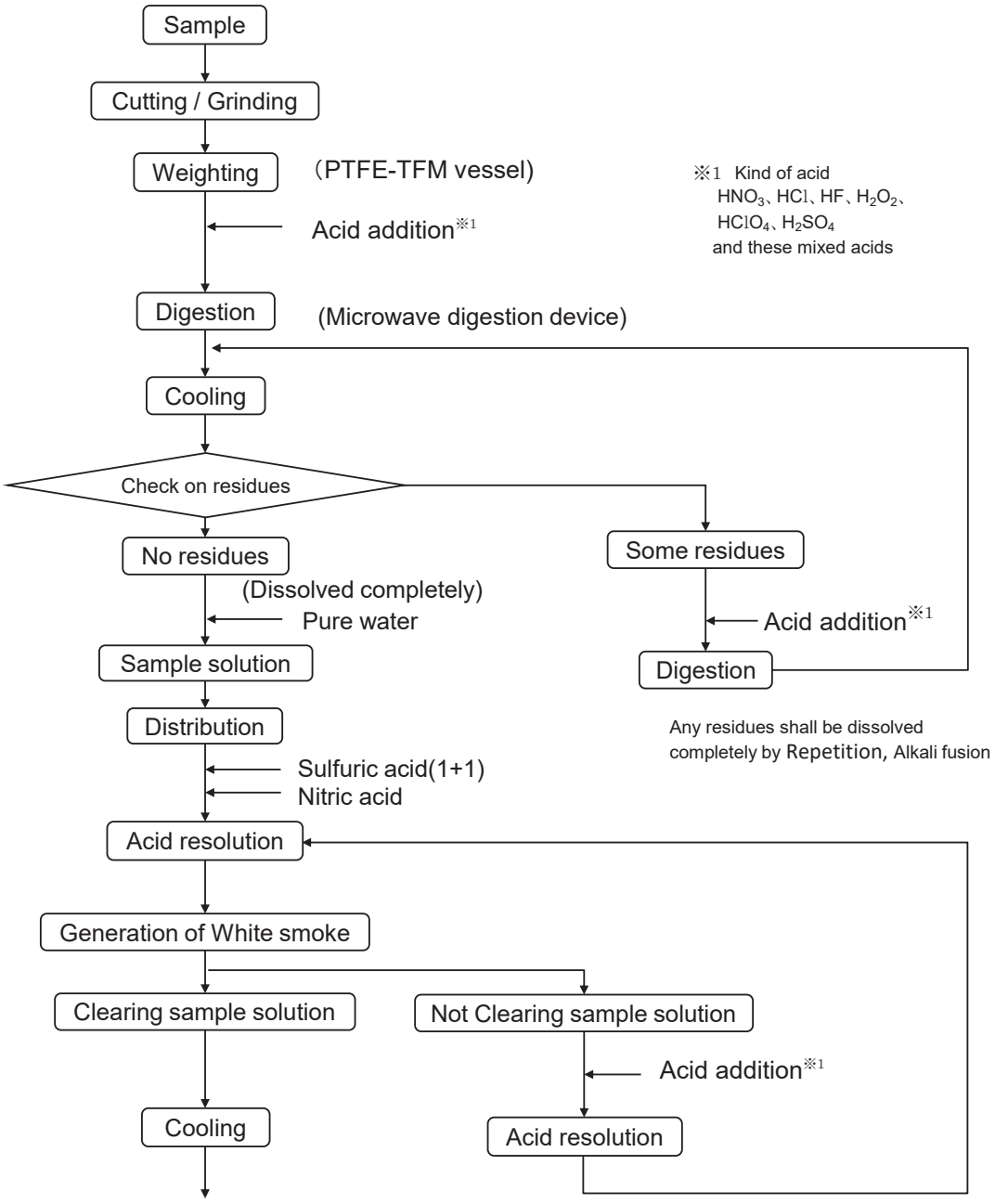
(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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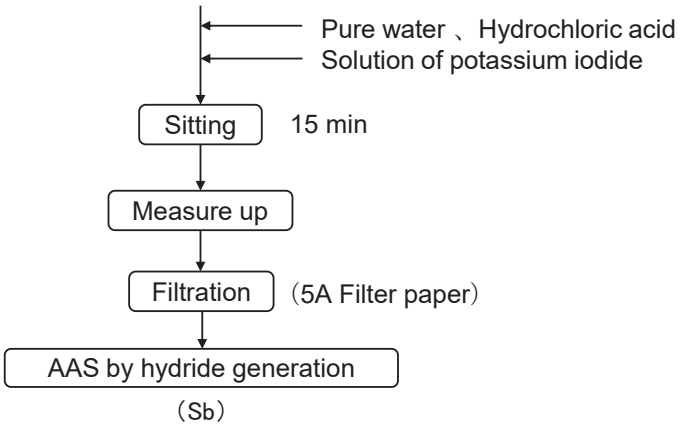

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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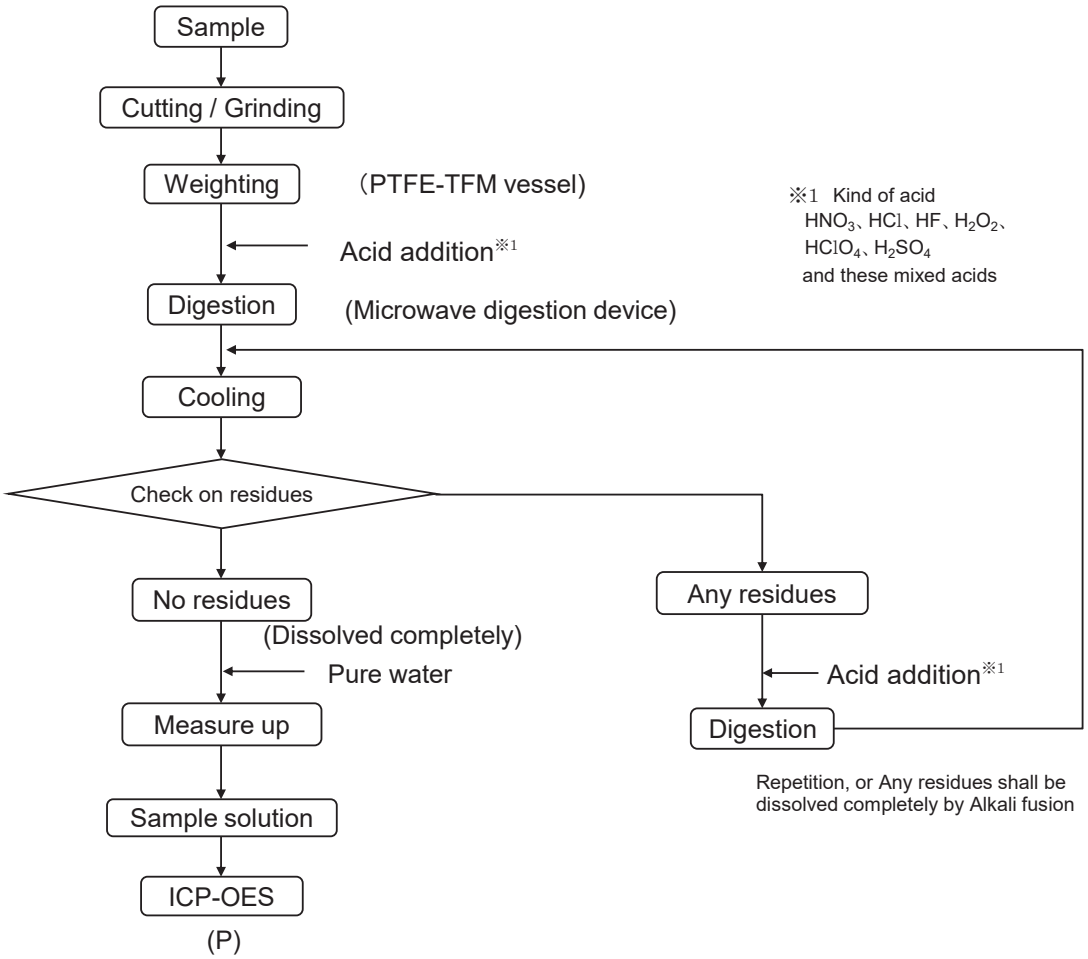
(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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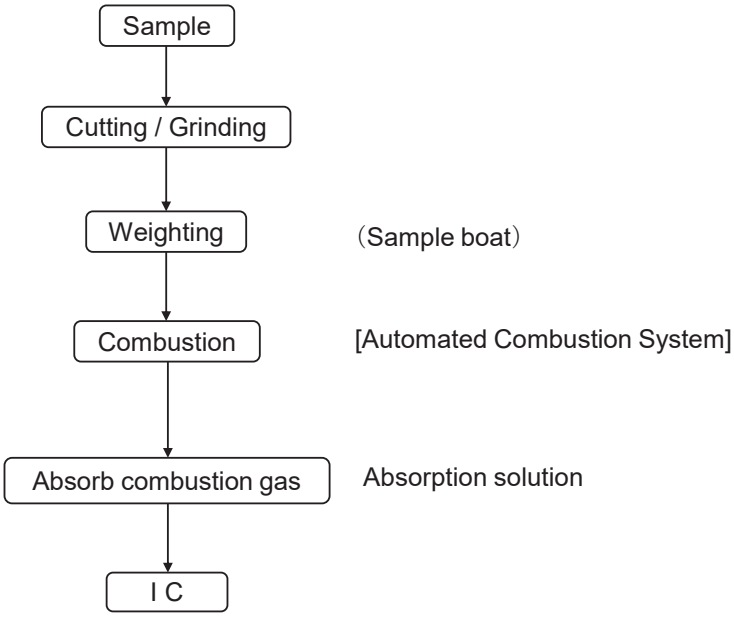
The Knights

(No.221219-10273-1)
Date:February 8,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)

〔Sample preparation : Combustion System〕



＜Equipment＞

・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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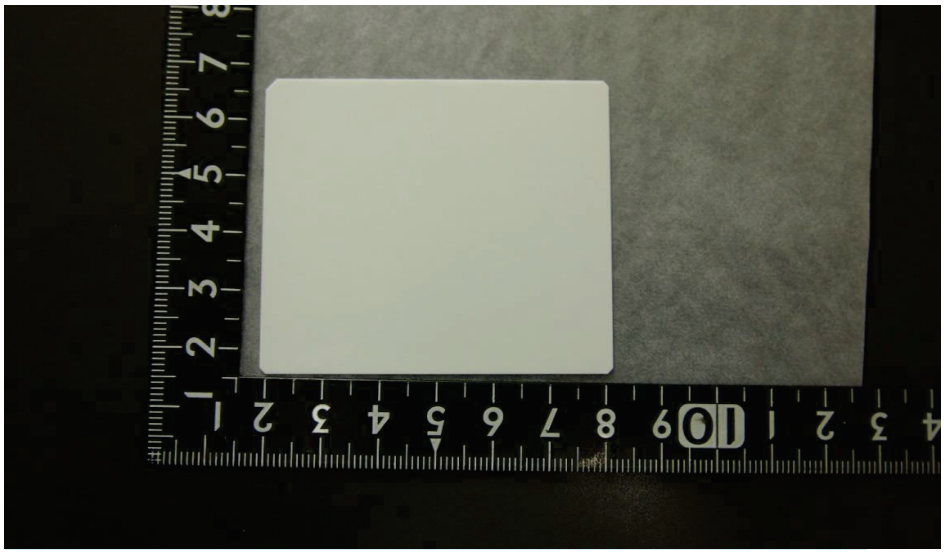
The Knights

(No.221219-10273-1)
Date:February 8,2023



Sample name : Product J-51

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The Knights

J-32-4

(No. 221219-10304-1)
Date :January 20, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-32-4
Item/Serial number	:	J-32-4
Test object	:	Product/Material Test
Testing period	:	December 20,2022 to January 19,2023
Sample collection method	:	Bring-in
Additional information	:	analyze "Ag/Pd/PbO"only on an alumina substrate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Lead(Pb)	3800	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	January 19, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

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The Knights

Test Report

(No. 221219-10304-1)
Date :January 20, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

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The Knights

(No.221219-10304-1)
Date:January 20,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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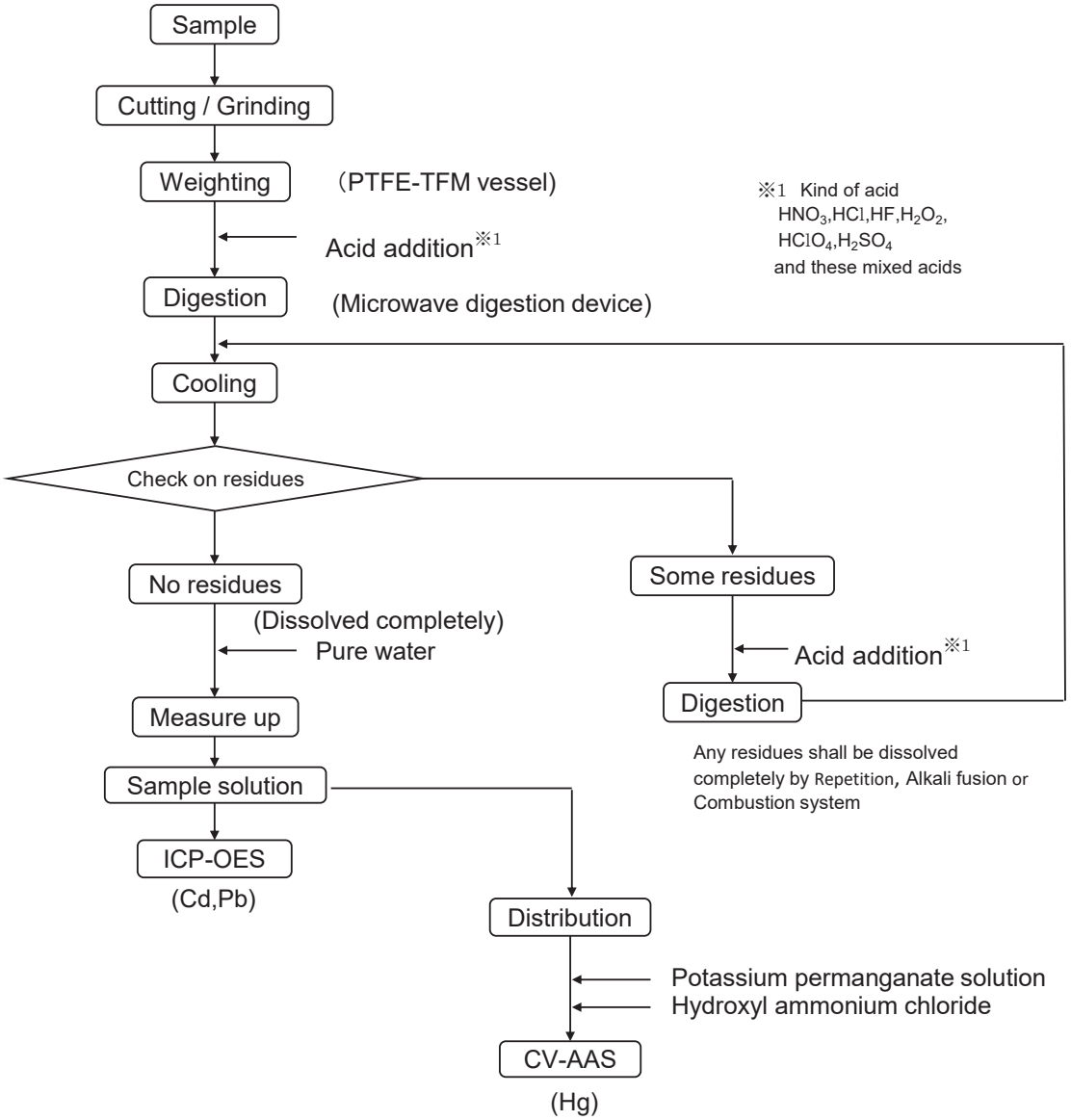
The Knights

(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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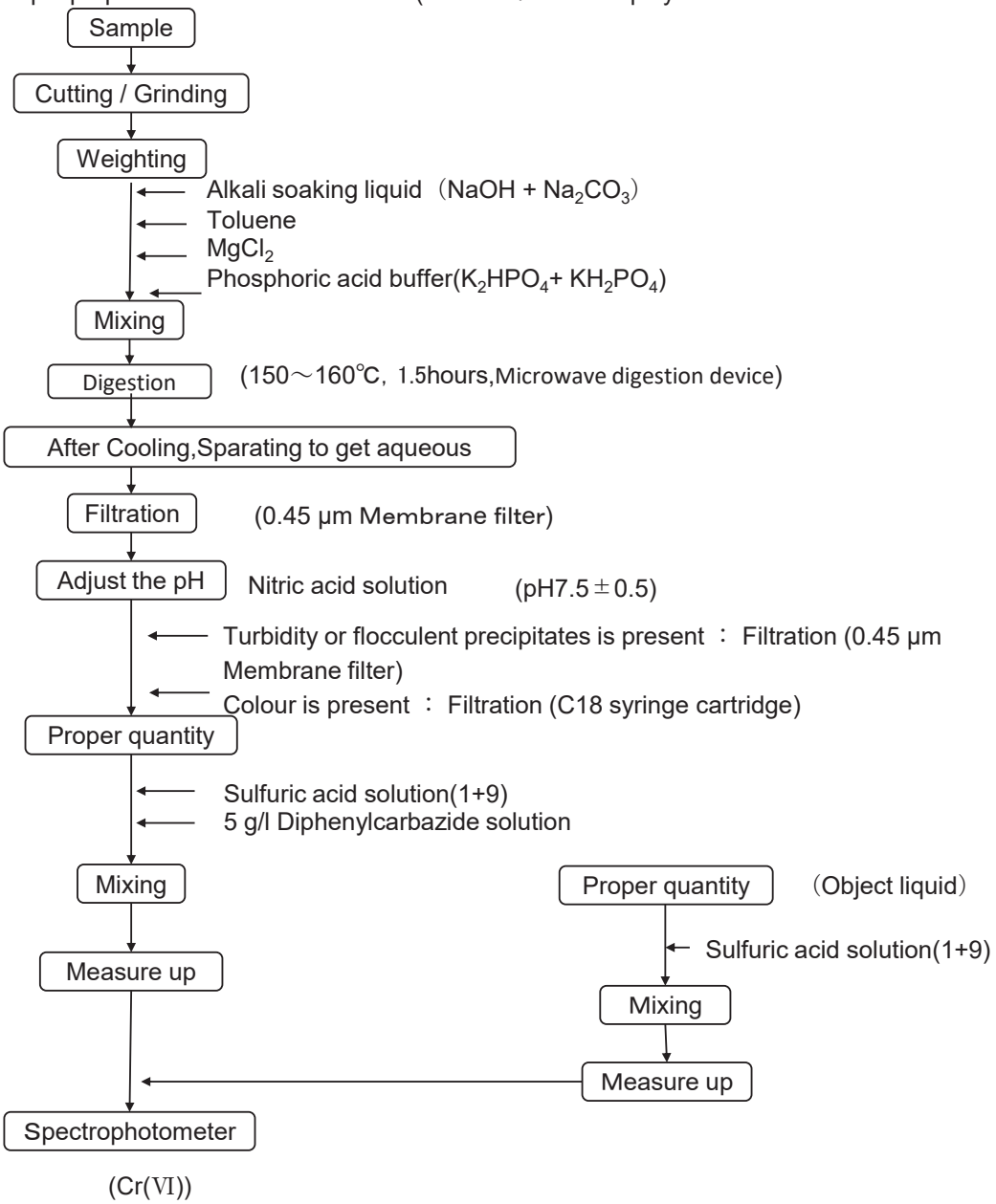
(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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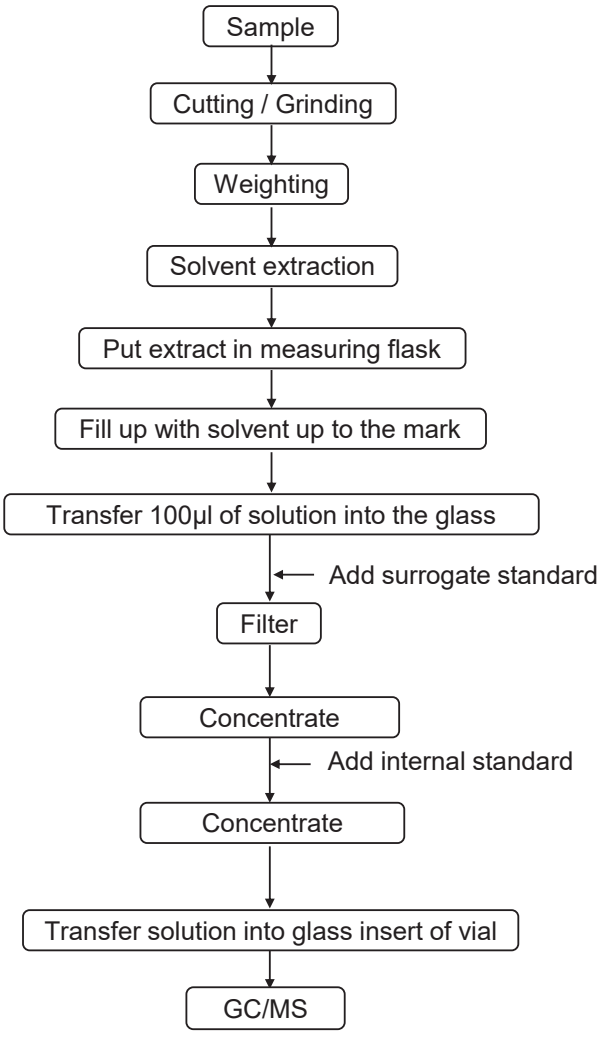
The Knights

(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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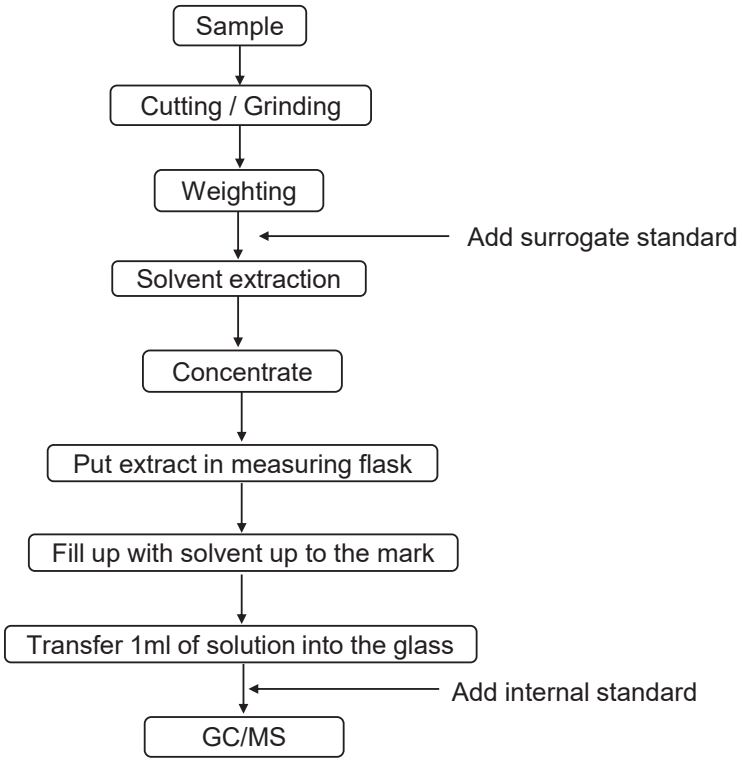
(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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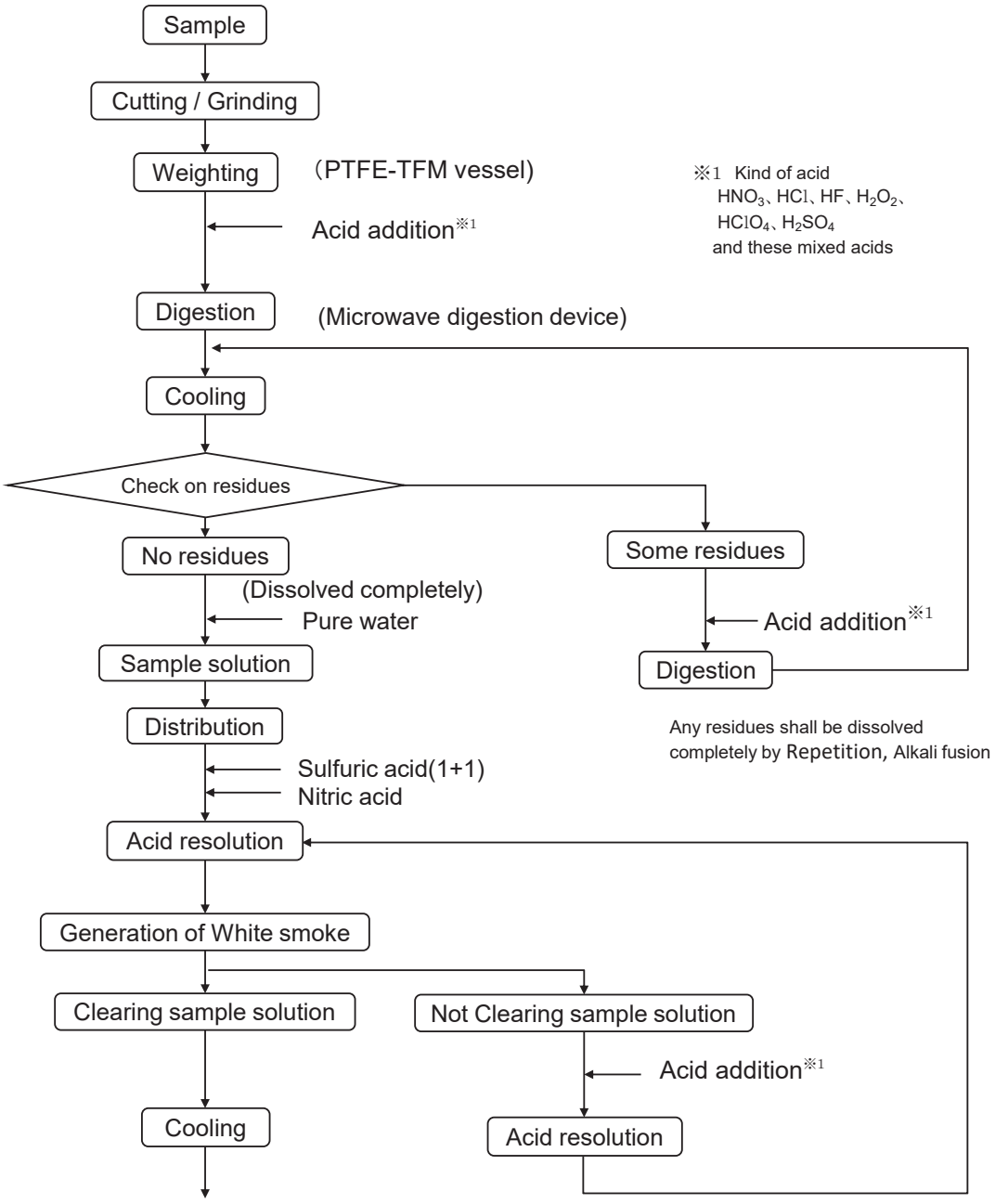
(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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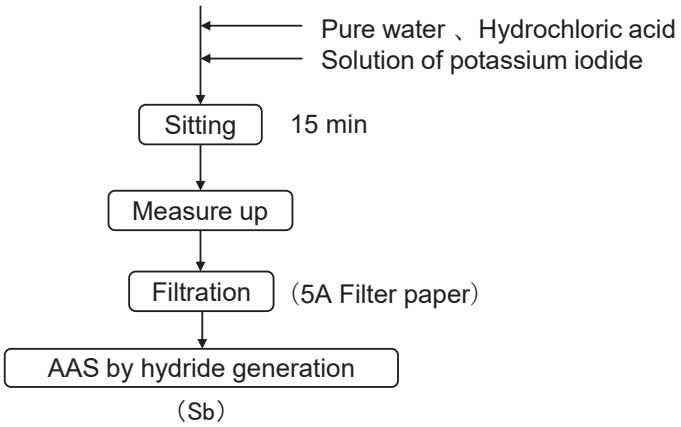

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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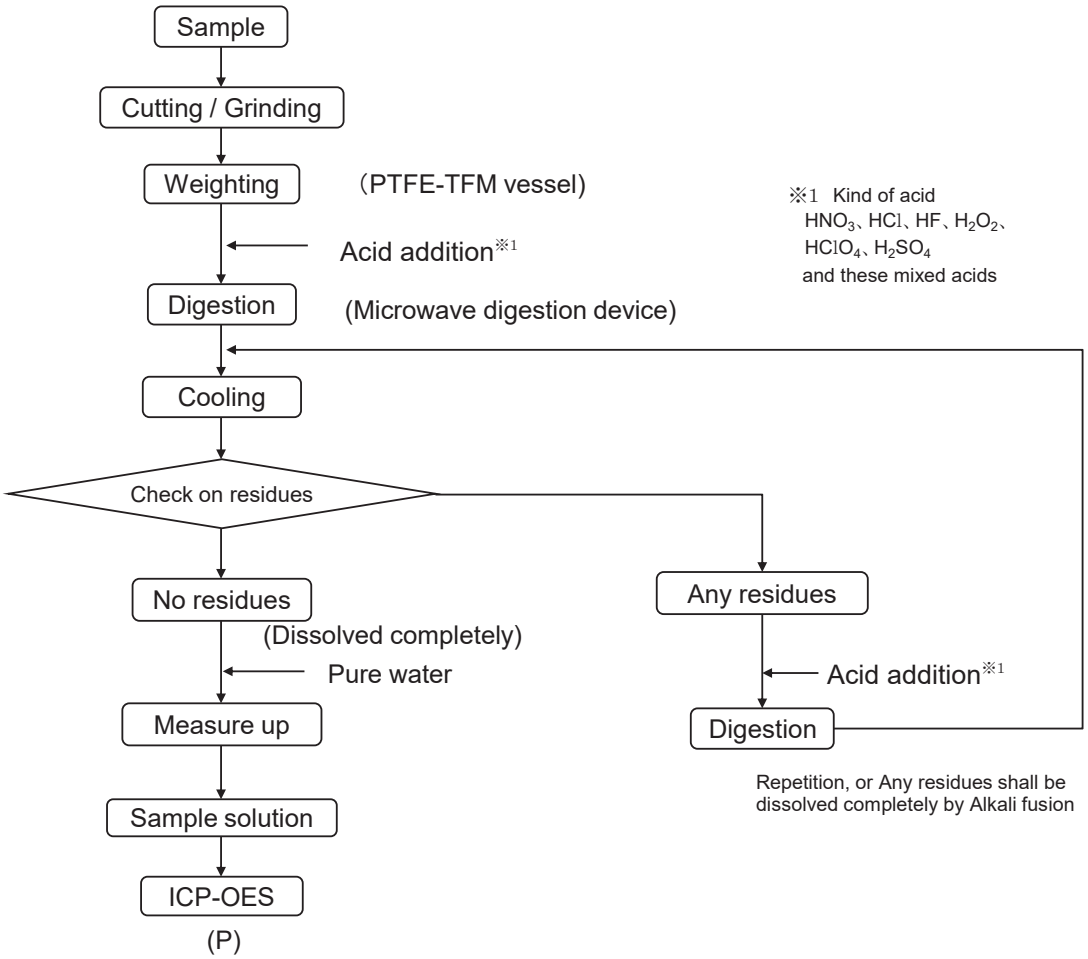
(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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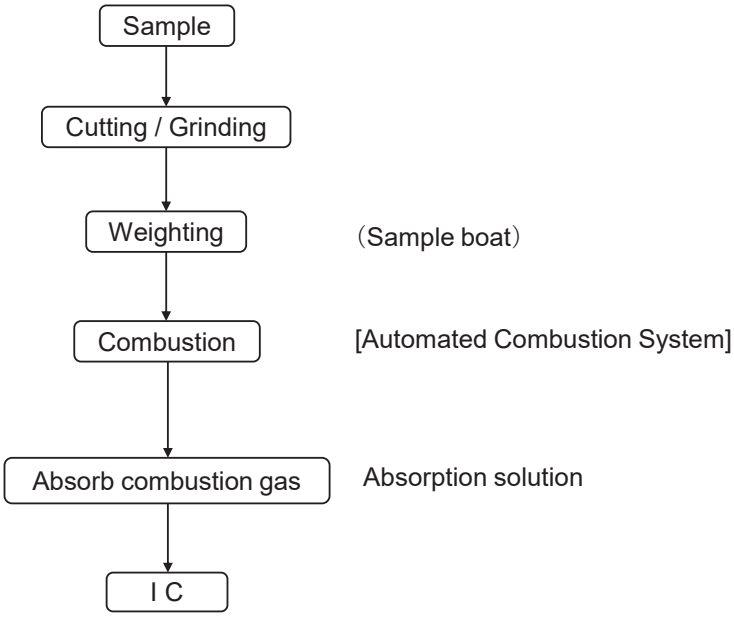
(No.221219-10304-1)
Date:January 20,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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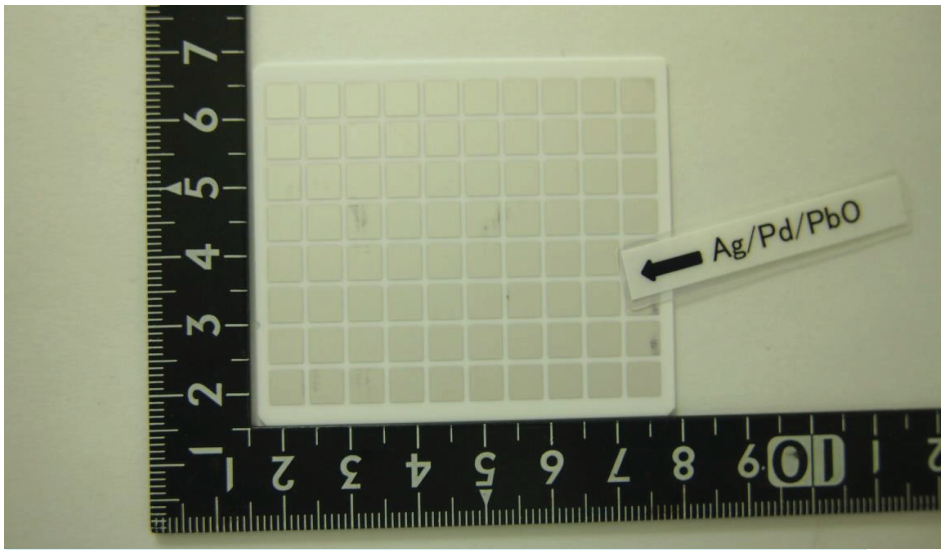
The Knights

(No.221219-10304-1)
Date:January 20,2023



Sample name : Product J-32-4

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The Knights

J-32-3

(No. 221219-10303-1)
Date :January 20, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-32-3
Item/Serial number	:	J-32-3
Test object	:	Product/Material Test
Testing period	:	December 20,2022 to January 19,2023
Sample collection method	:	Bring-in
Additional information	:	analyze "Ag/PbO"only on an alumina substrate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Lead(Pb)	3700	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	January 19, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

Shinichi Tobe
Environmental Certified public Measurers
NAITOH Environmental Science Co.,Ltd.

デジタル署名 : Mari Sanada
付 : 2023.01.20 17:09:11 +09'00'

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The Knights

Test Report

(No. 221219-10303-1)
Date :January 20, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

Shinichi Tobe
Environmental Certified public Measurers
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The Knights

(No.221219-10303-1)
Date:January 20,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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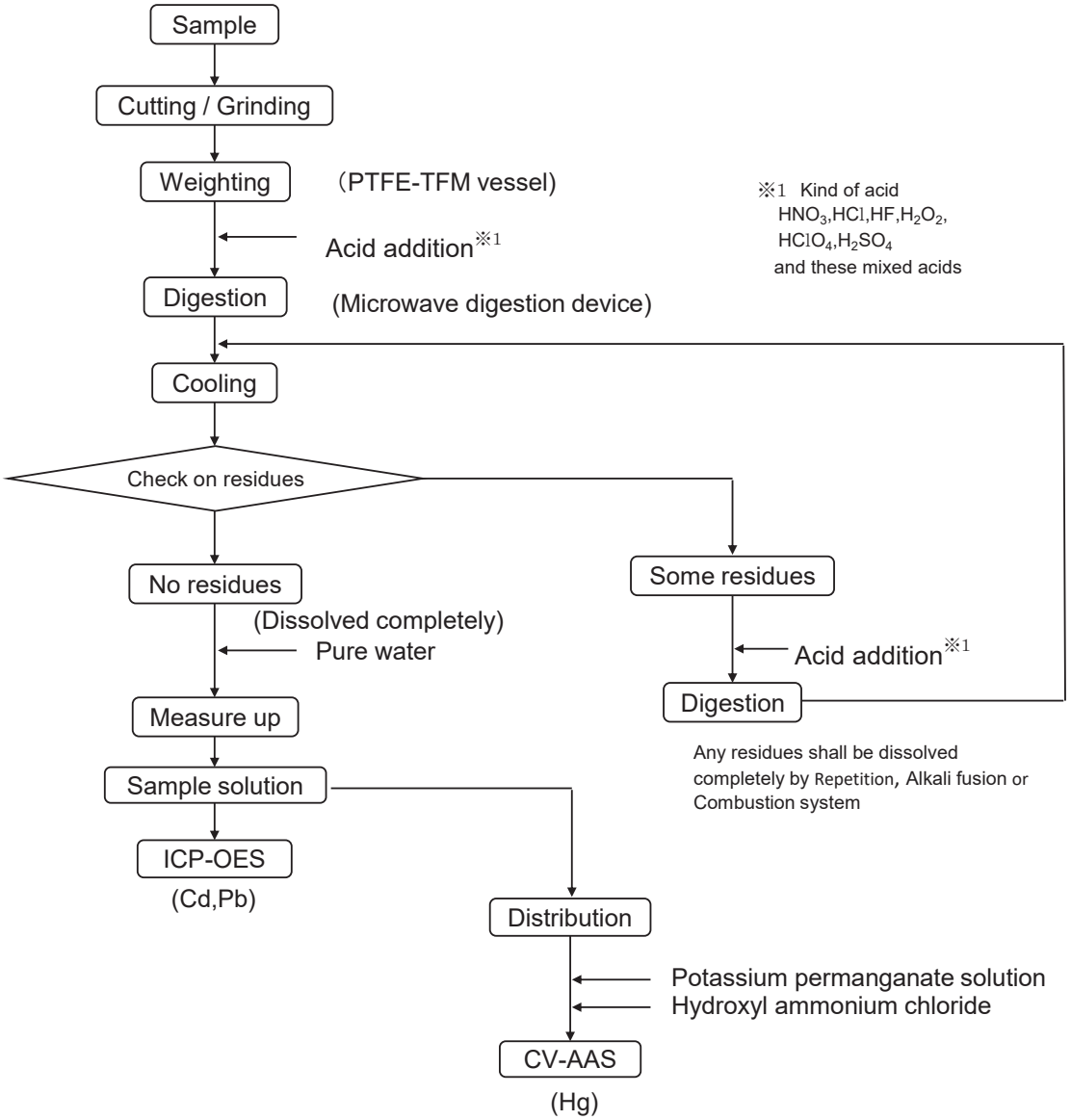
The Knights

(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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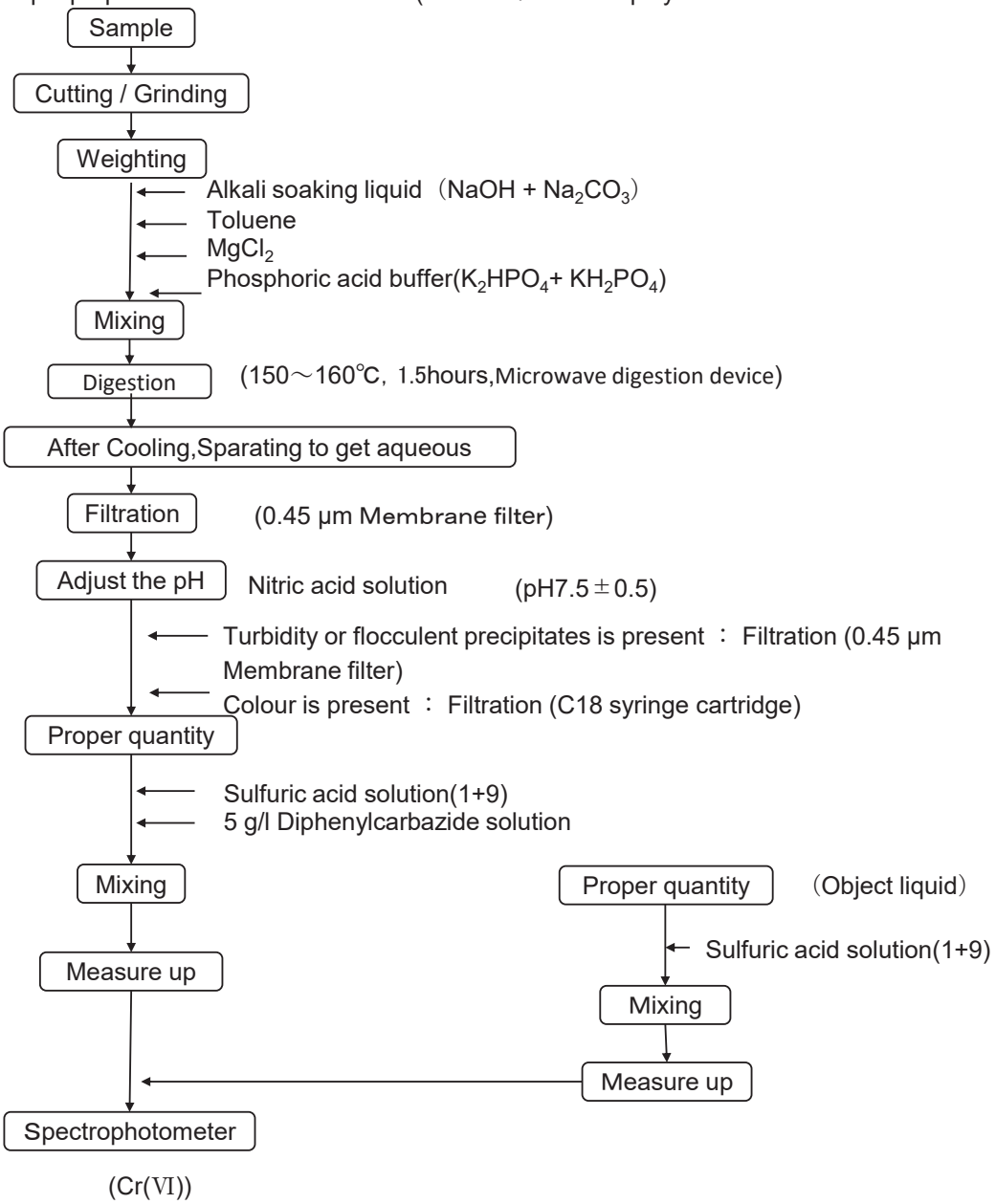
The Knights

(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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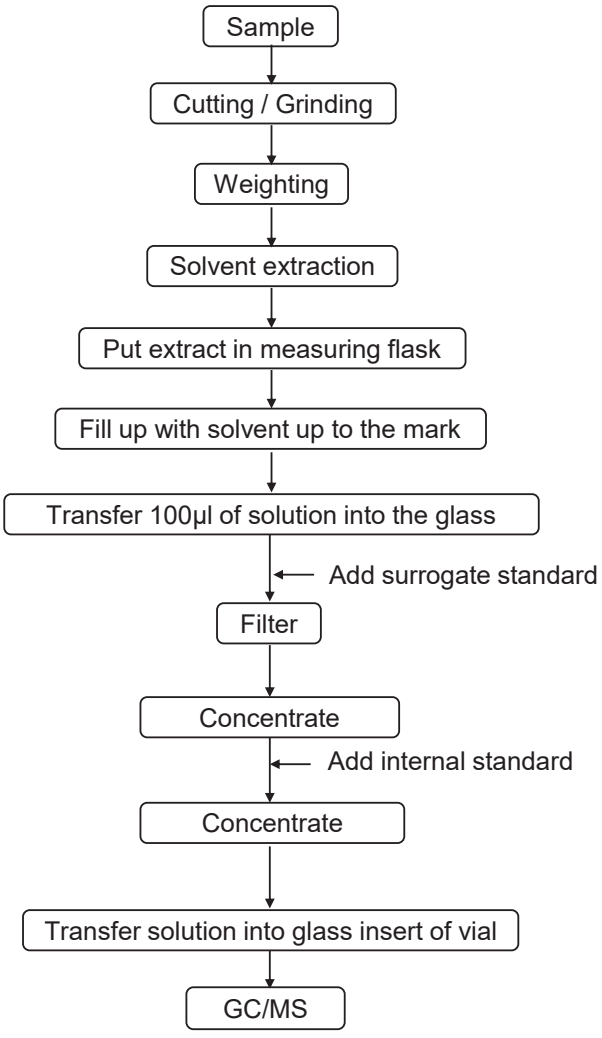
The Knights

(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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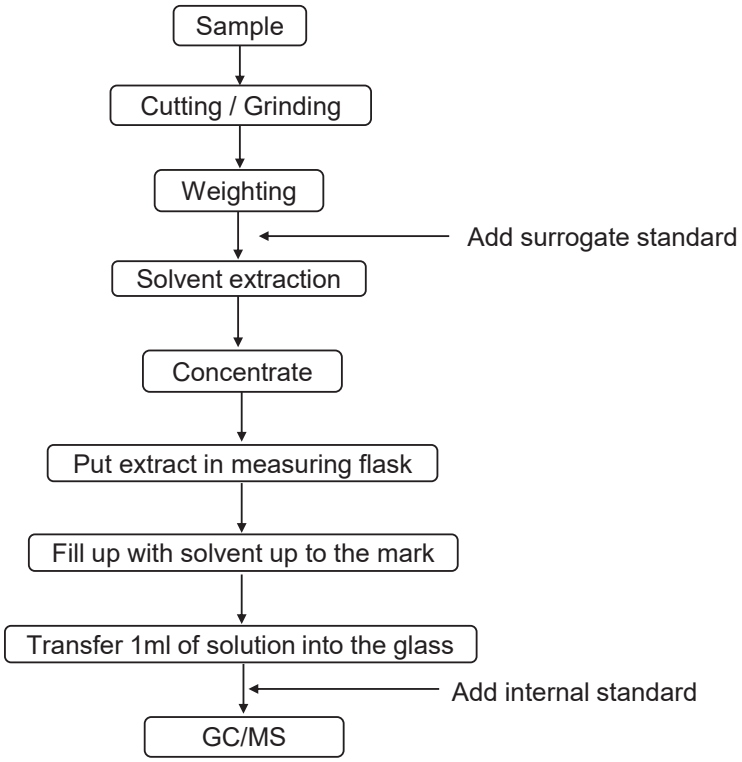
The Knights

(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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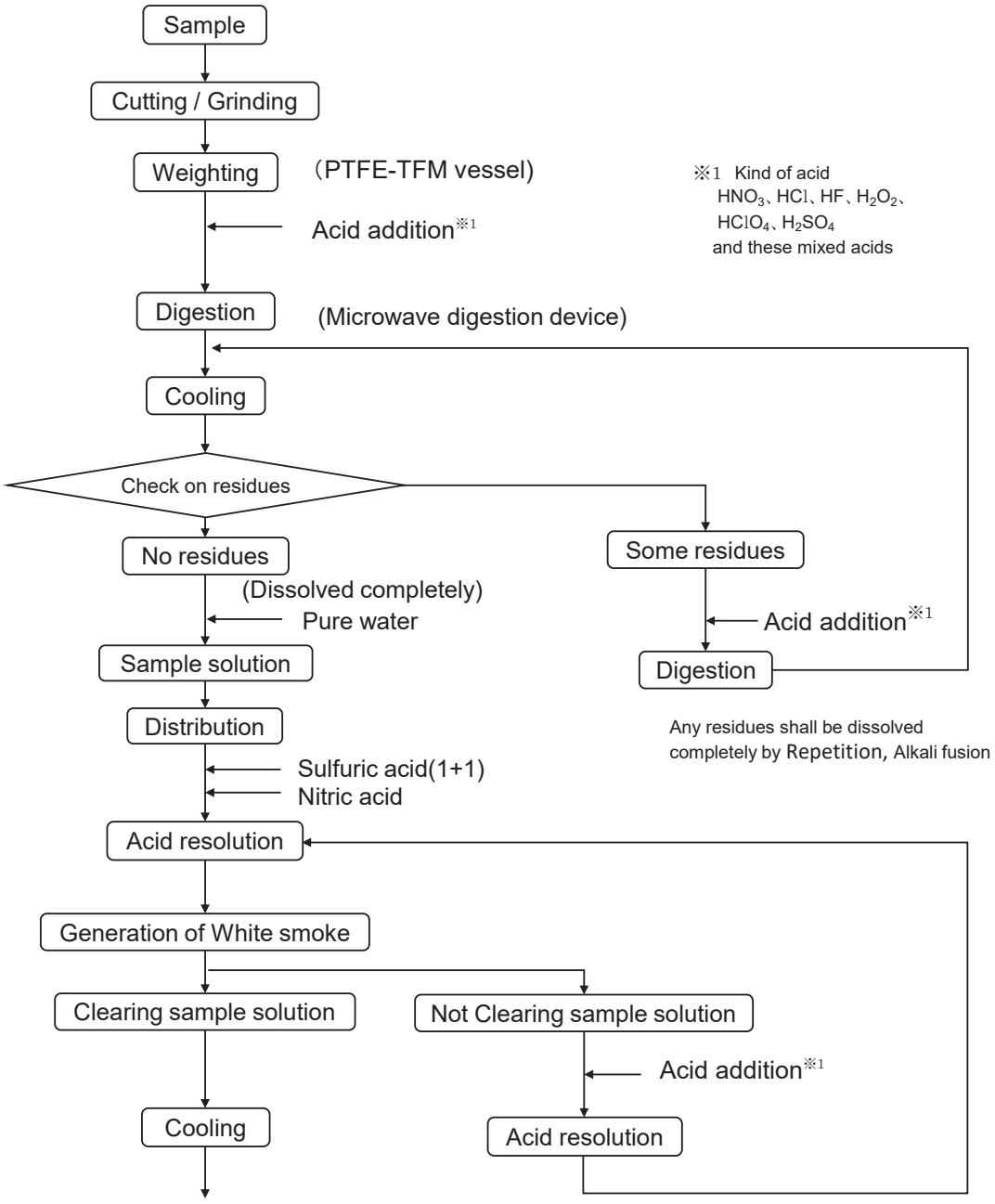
The Knights

(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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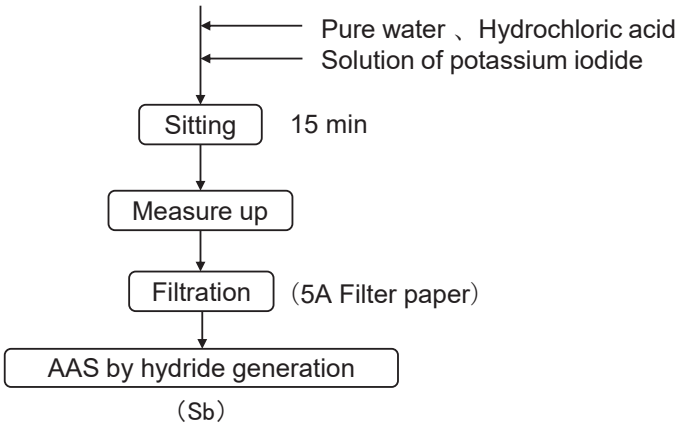

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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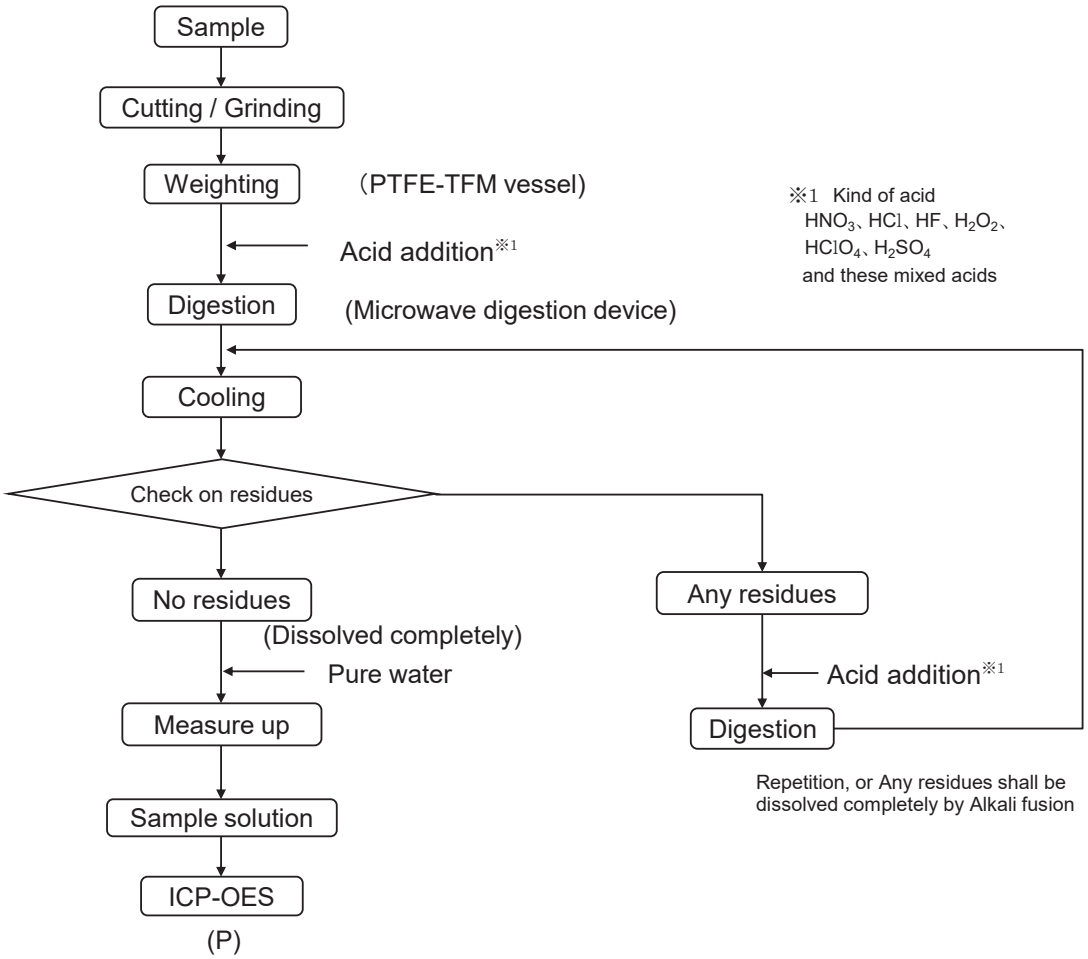
(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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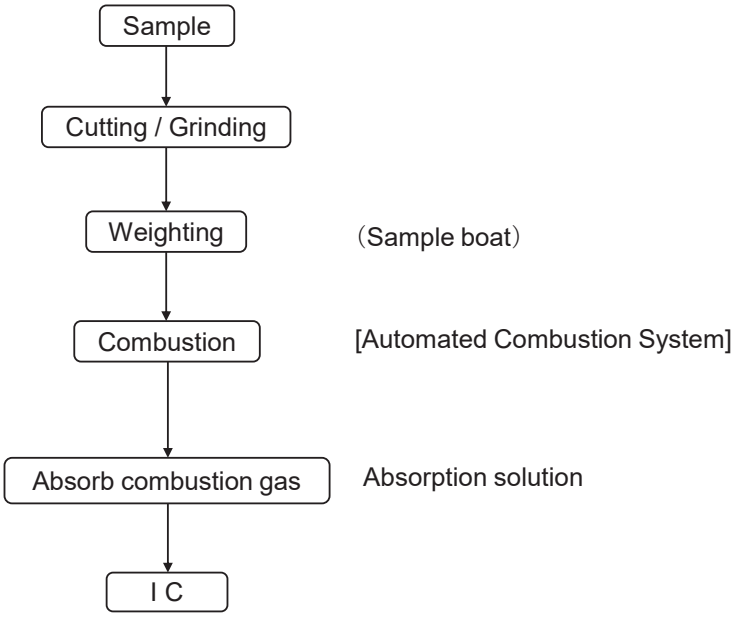
The Knights

(No.221219-10303-1)
Date:January 20,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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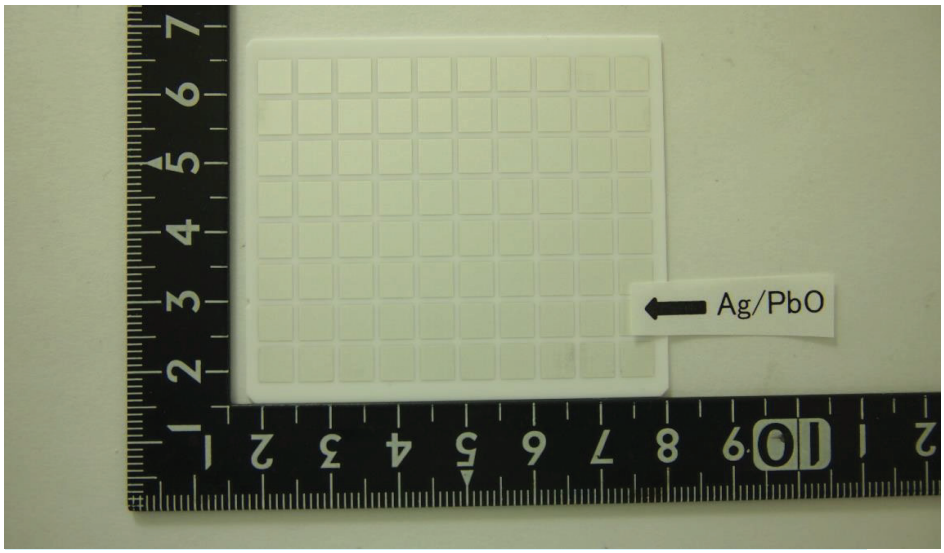
(No.221219-10303-1)
Date:January 20,2023



Sample name : Product J-32-3

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The Knights

J-32-7

(No. 221219-10315-1)
Date :January 20, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-32-7
Item/Serial number	:	J-32-7
Test object	:	Product/Material Test
Testing period	:	December 20,2022 to January 19,2023
Sample collection method	:	Bring-in
Additional information	:	analyze "RuO2/PbO"only on an alumina substrate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Lead(Pb)	46000	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	January 19, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

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Mari Sanada
デジタル署名者 : Mari Sanada
付 : 2023.01.20 16:53:15 +09'00'

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The Knights

Test Report

(No. 221219-10315-1)
Date :January 20, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

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The Knights

(No.221219-10315-1)
Date:January 20,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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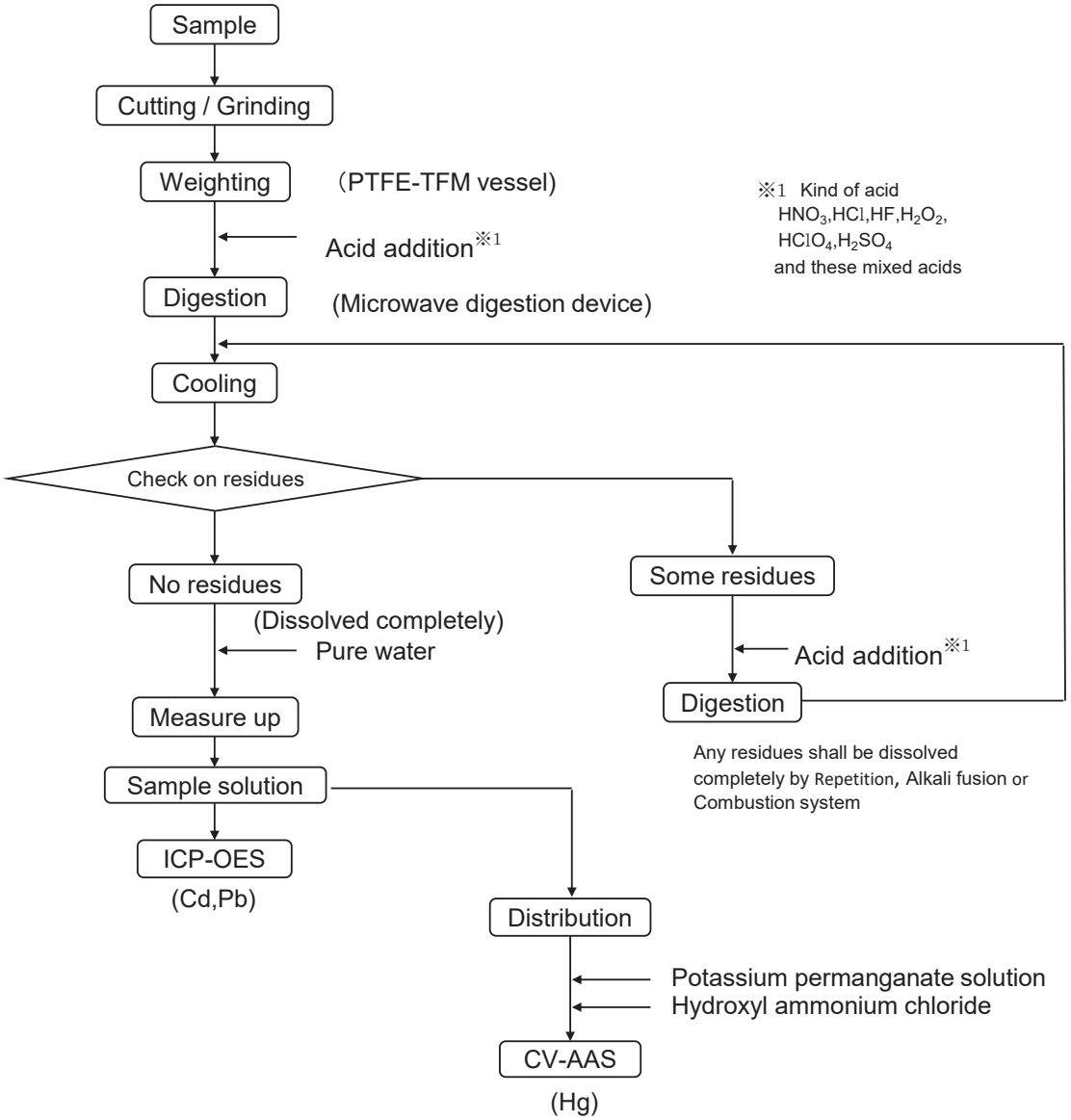
(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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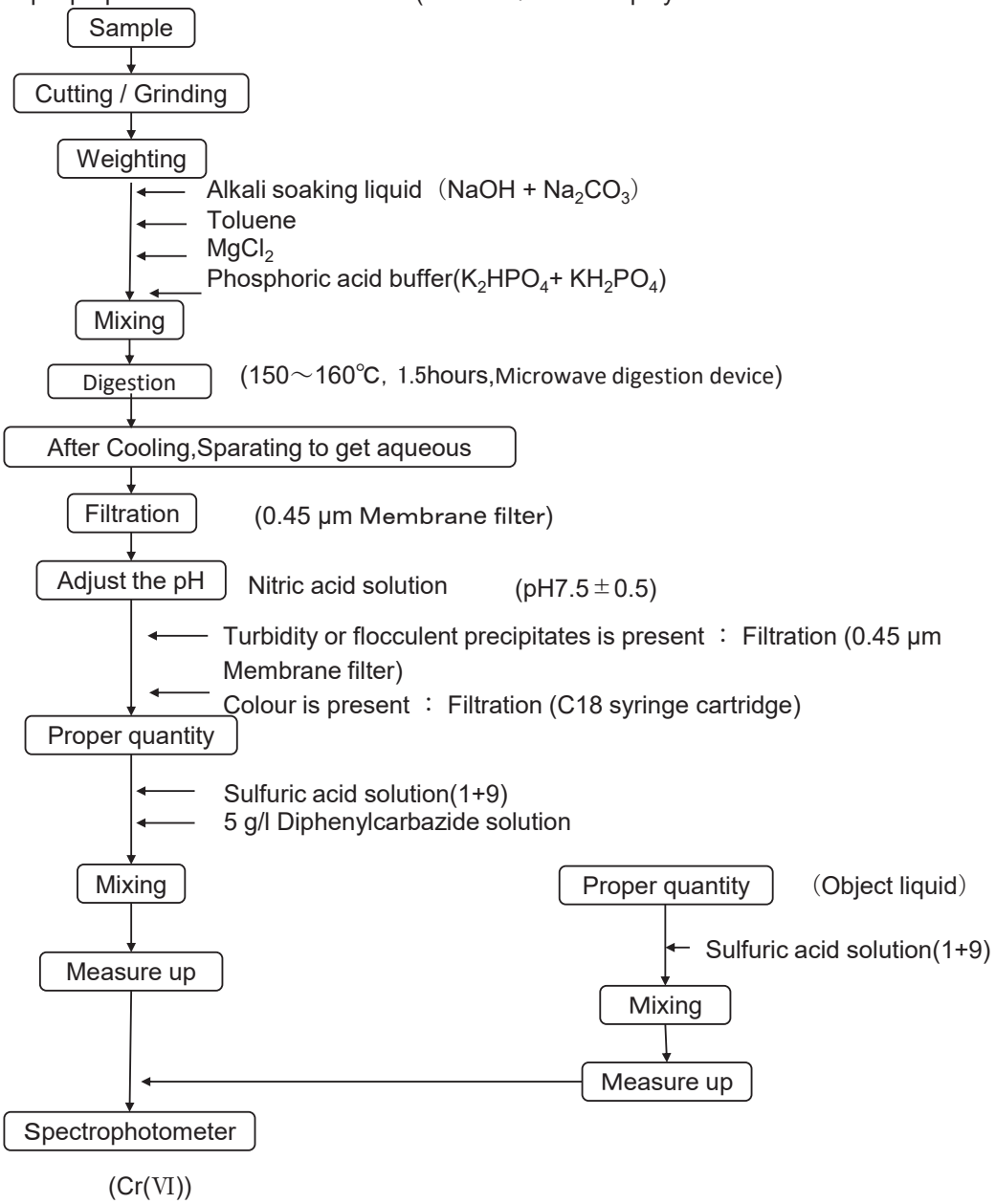
(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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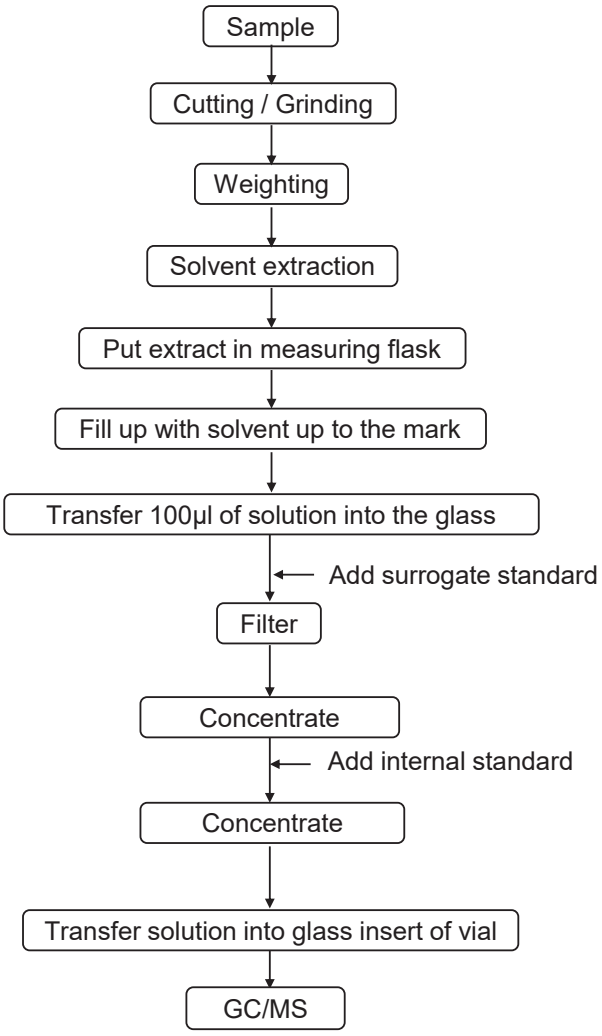
The Knights

(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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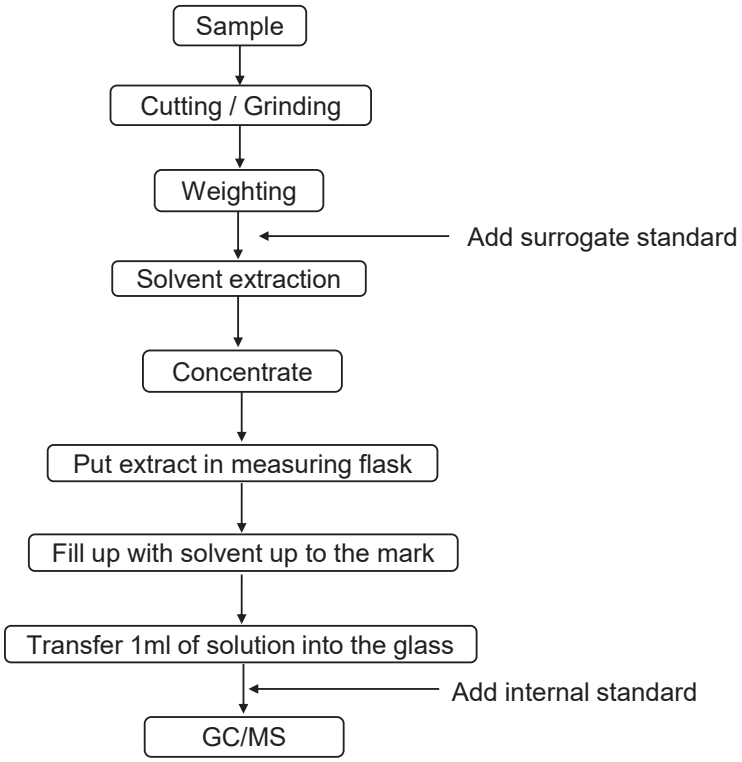
(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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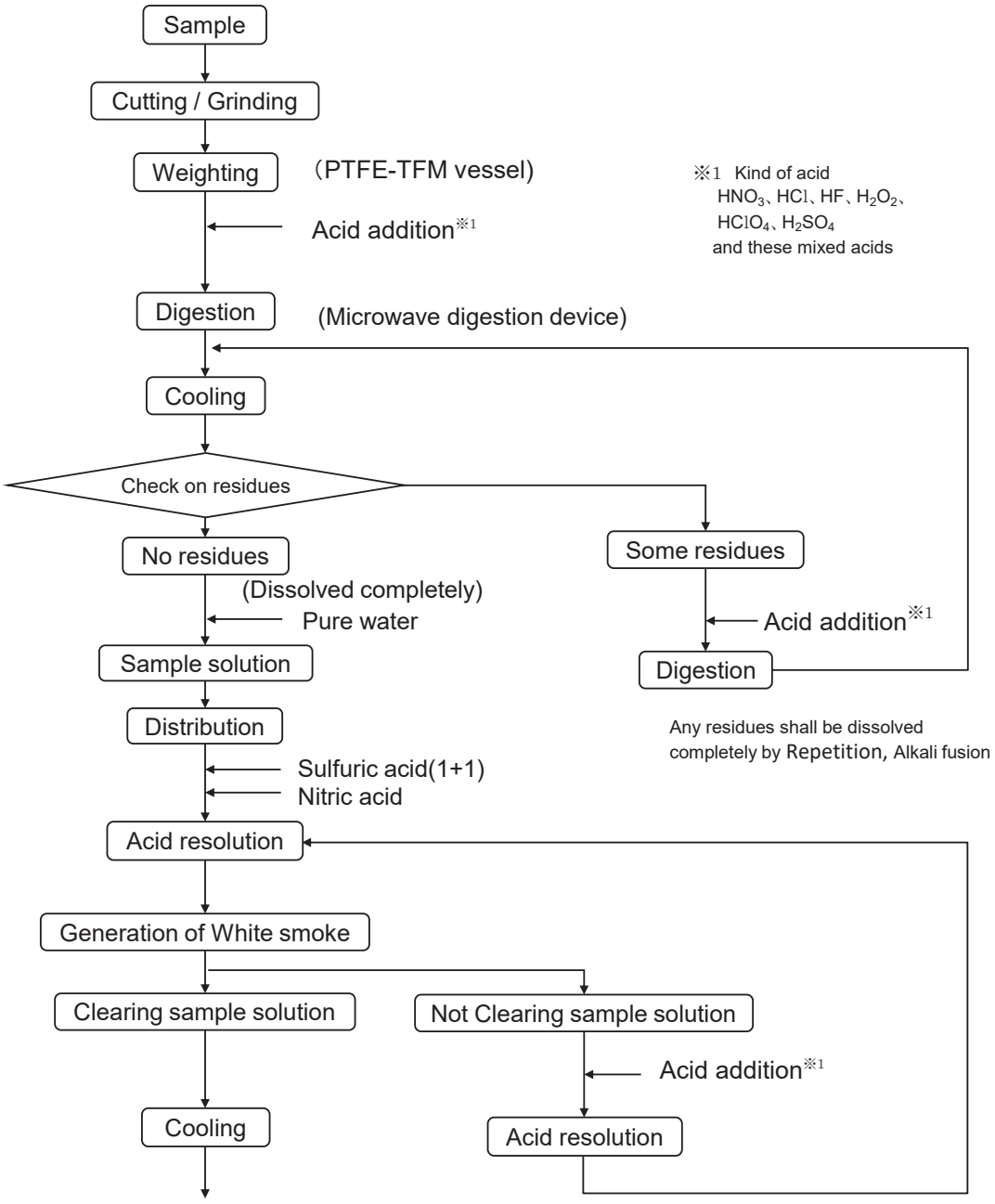
(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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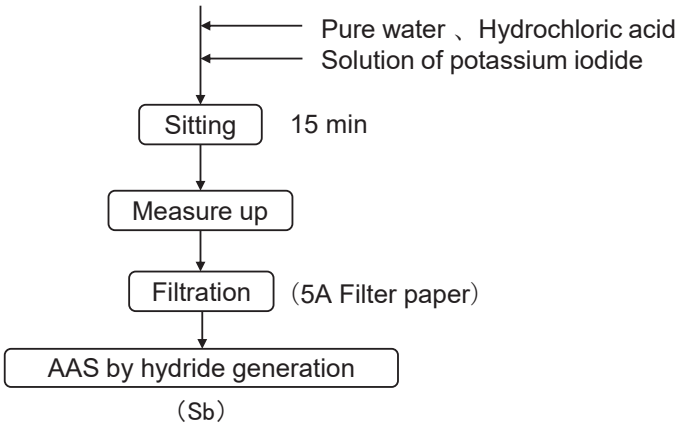

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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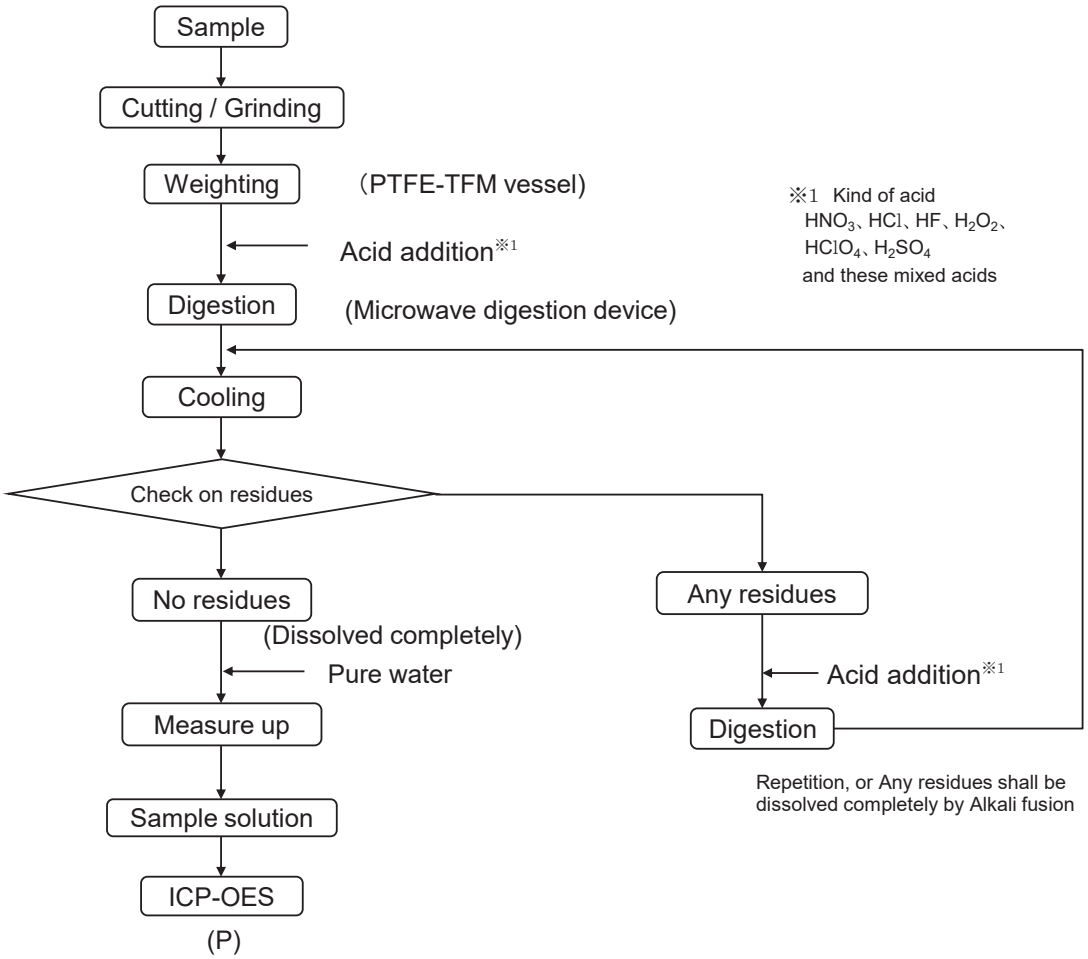
(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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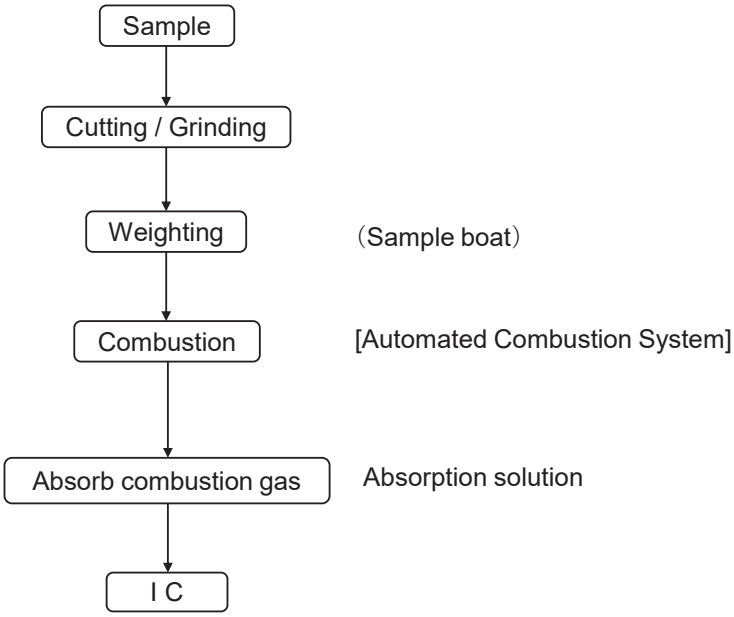
(No.221219-10315-1)
Date:January 20,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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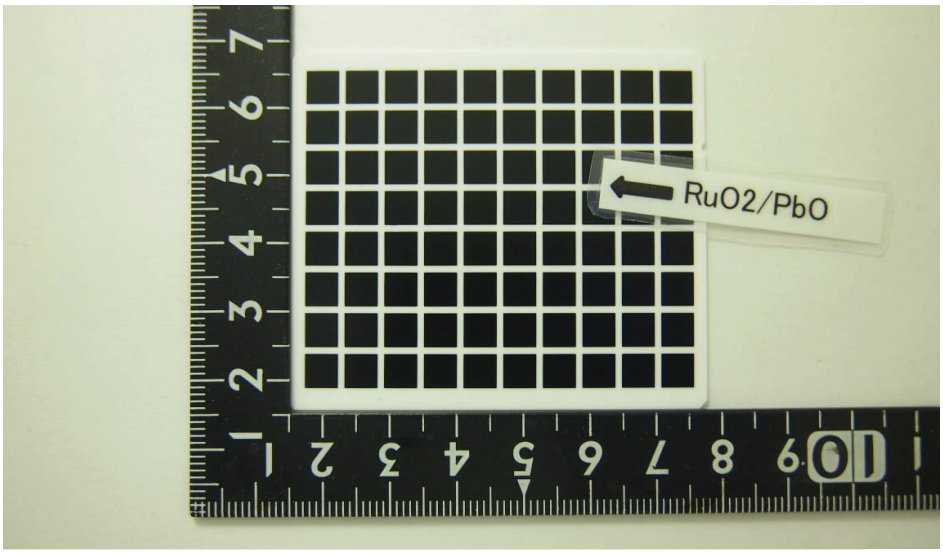
(No.221219-10315-1)
Date:January 20,2023



Sample name : Product J-32-7

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The Knights

J-32-9

(No. 221219-10313-1)
Date :January 20, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-32-9
Item/Serial number	:	J-32-9
Test object	:	Product/Material Test
Testing period	:	December 20,2022 to January 19,2023
Sample collection method	:	Bring-in
Additional information	:	analyze "Frit Glass PbO"only on an alumina substrate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Lead(Pb)	250000	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	January 19, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	January 19, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

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The Knights

Test Report

(No. 221219-10313-1)
Date :January 20, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	January 19, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	January 19, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	January 19, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

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The Knights

(No.221219-10313-1)
Date:January 20,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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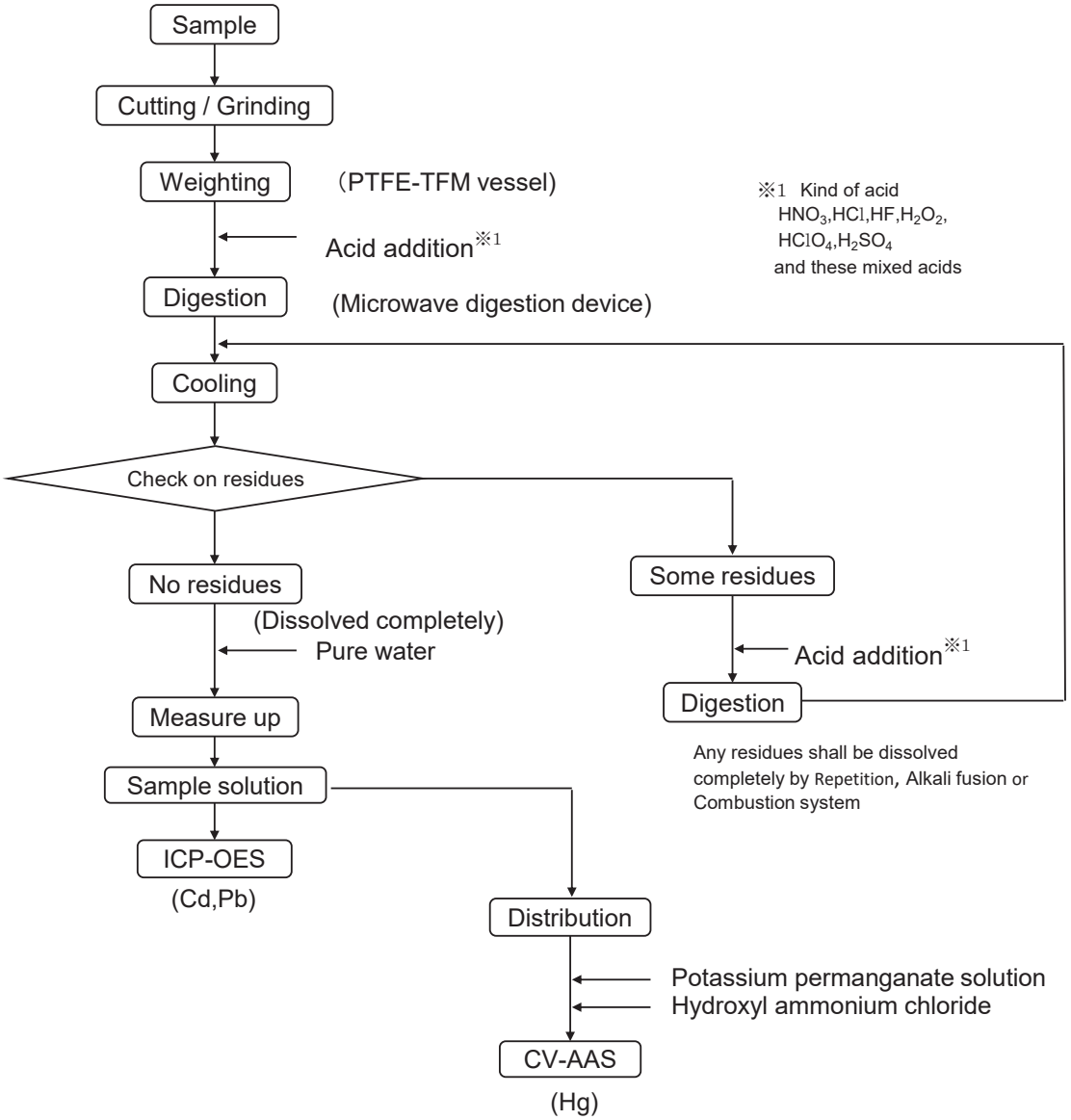
The Knights

(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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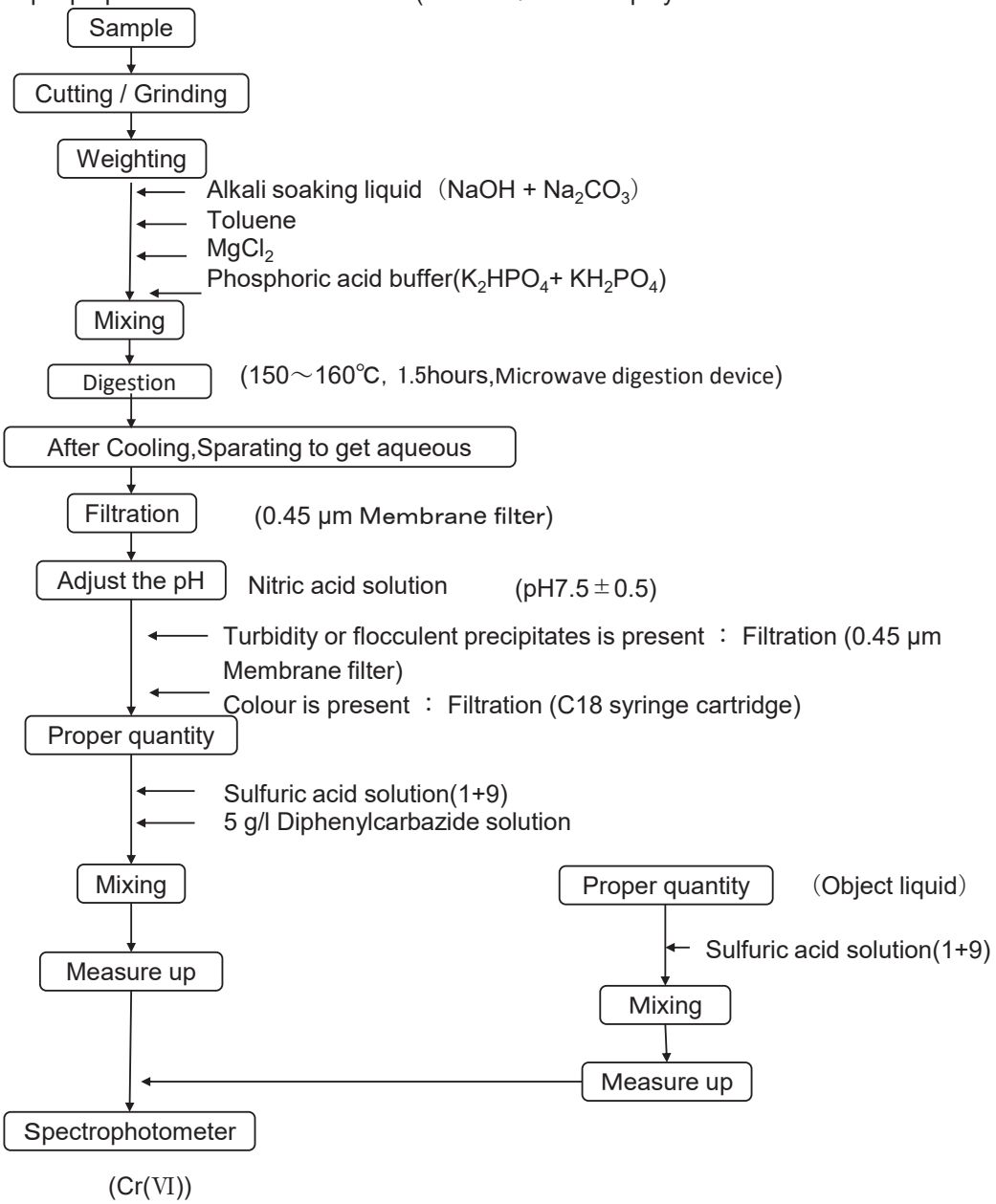
The Knights

(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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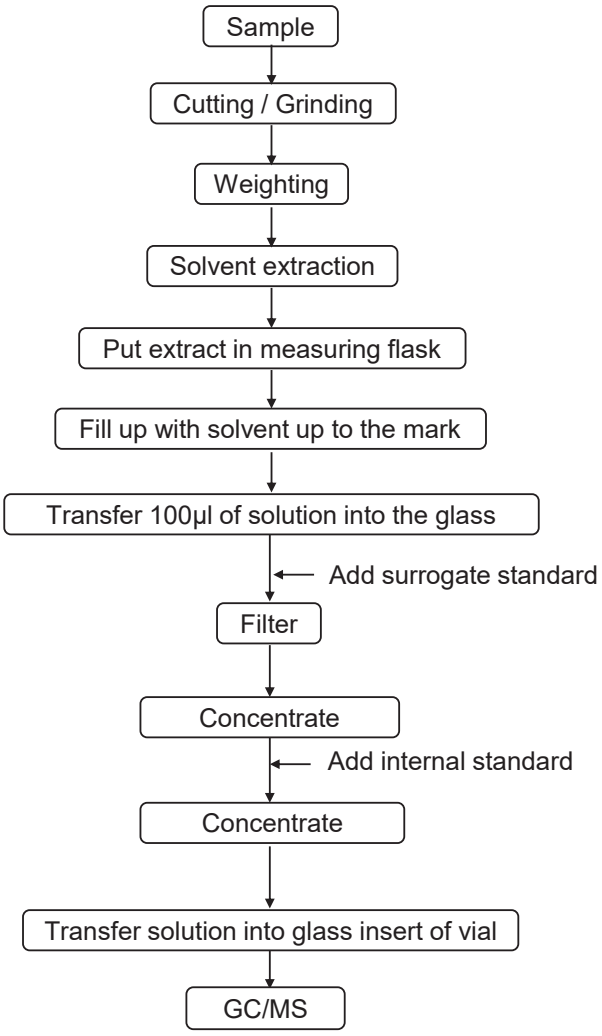
The Knights

(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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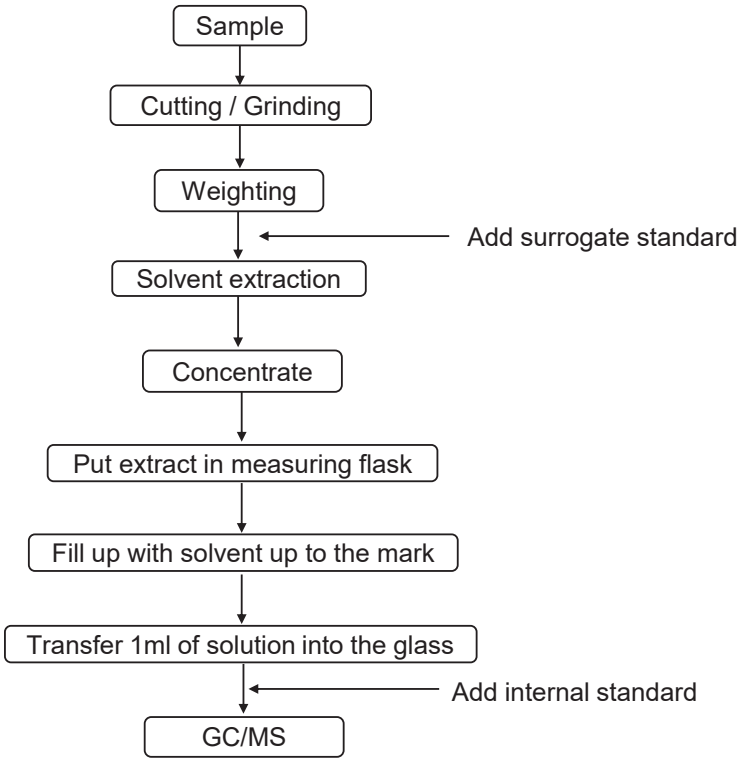
(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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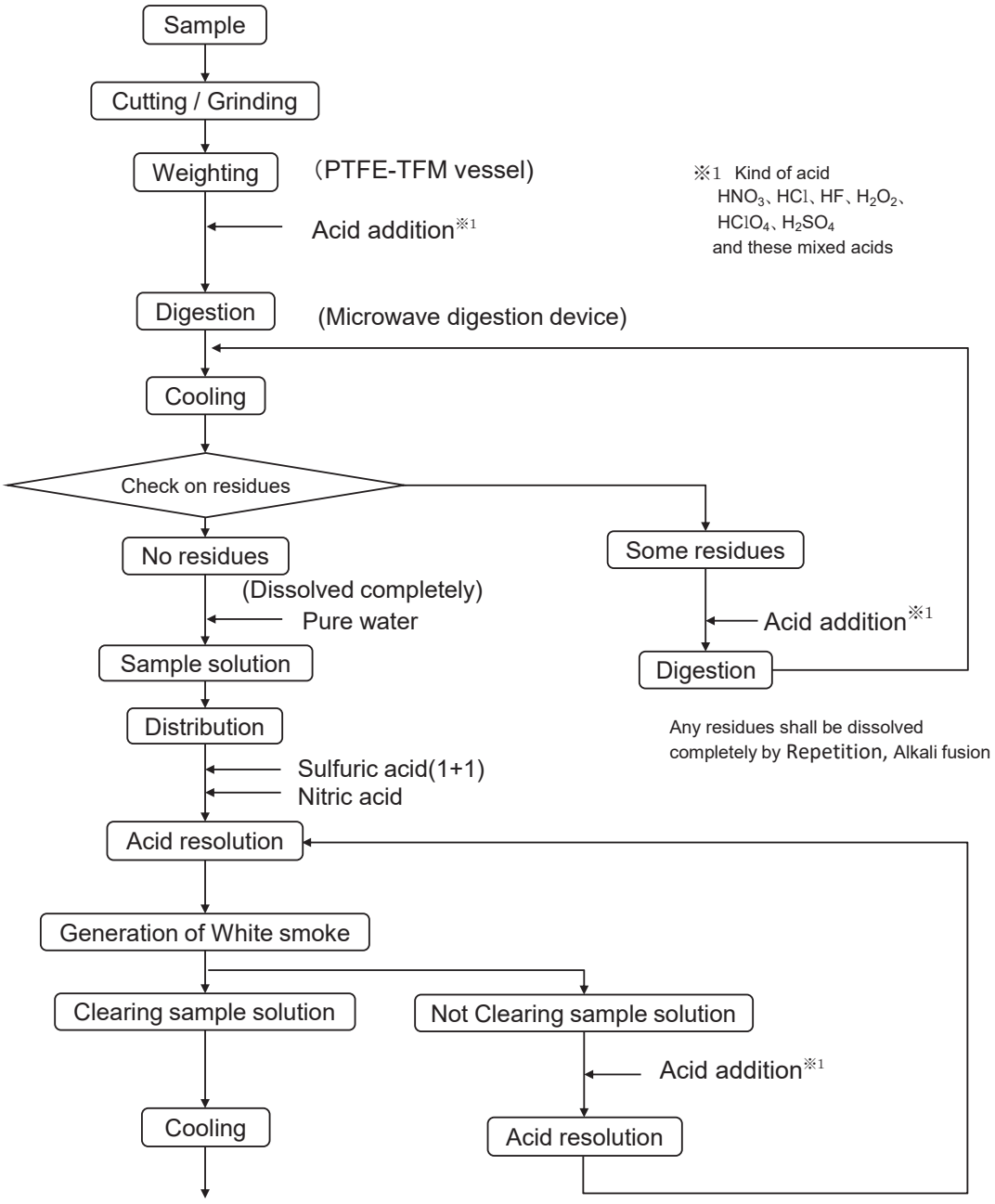
(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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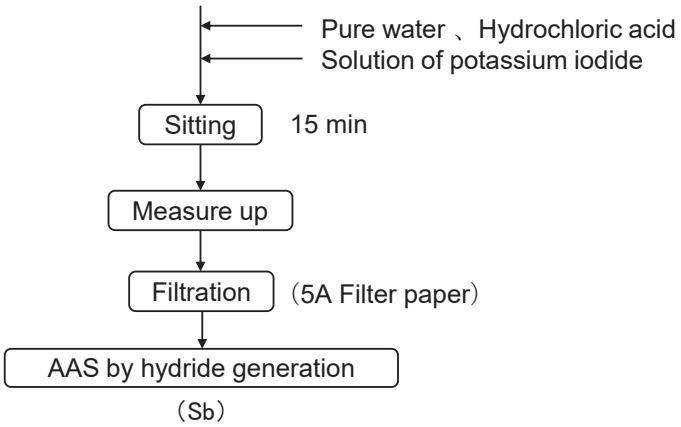

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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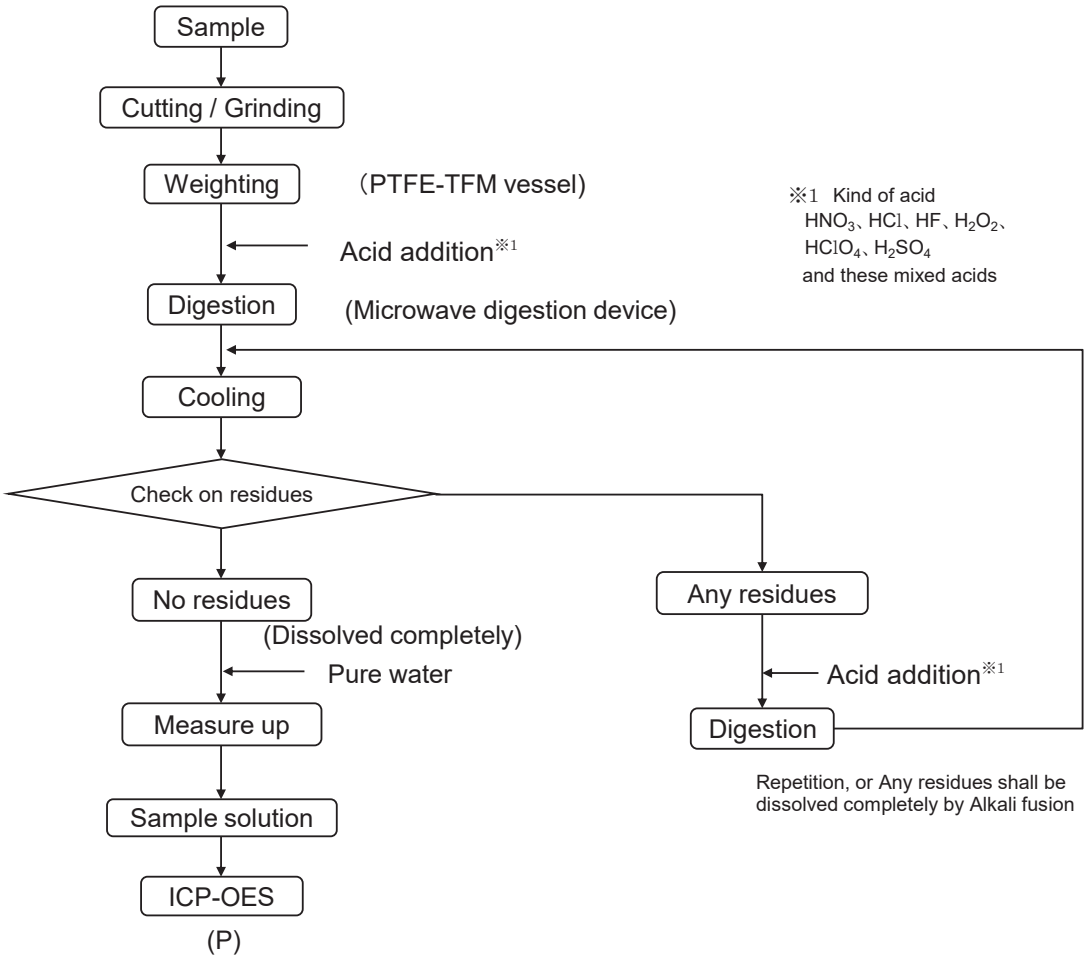
The Knights

(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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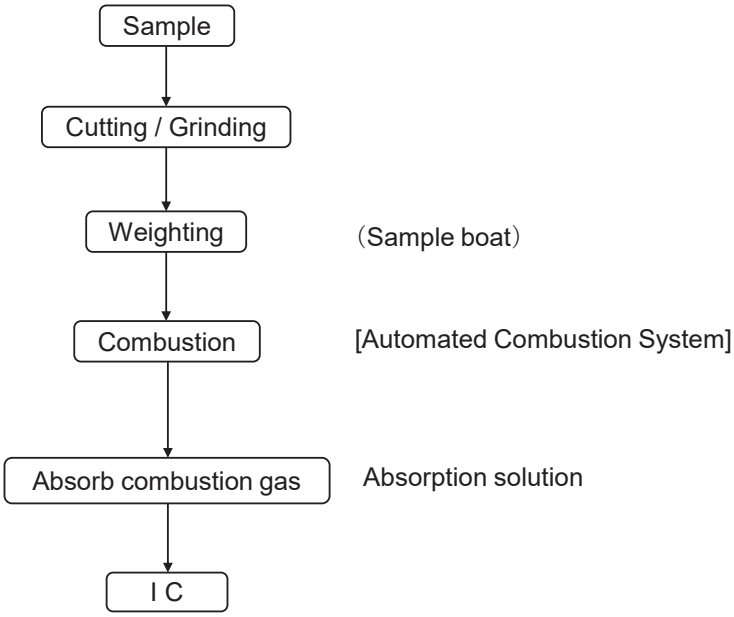
The Knights

(No.221219-10313-1)
Date:January 20,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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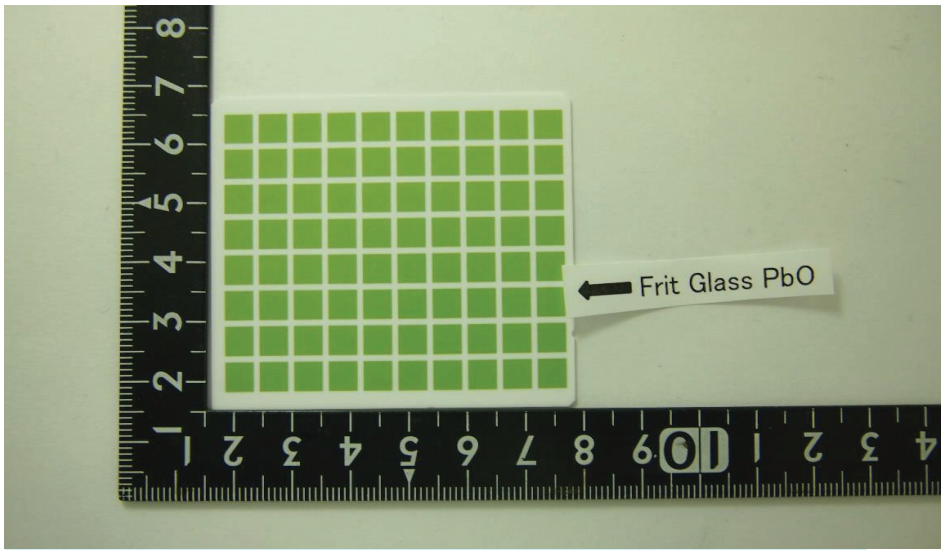
The Knights

(No.221219-10313-1)
Date:January 20,2023



Sample name ： Product J-32-9

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The Knights

J-58

(No. 230310-02179-1)

Date :April 5, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-58
Item/Serial number	:	J-58
Test object	:	Product/Material Test
Testing period	:	March 13,2023 to April 4,2023
Sample collection method	:	Bring-in
Additional information	:	analyze "Epoxy Resin"only on an alumina substrate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Lead(Pb)	N.D.	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	April 4, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	April 4, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	April 4, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023

Shinichi Tobe

Shinichi Tobe
Environmental Certified public Measurers
NAITOH Environmental Science Co.,Ltd.

Mari Sanada
デジタル署名者：Mari Sanada
付：2023.04.05 16:18:53 +09'00'

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The Knights

Test Report

(No. 230310-02179-1)

Date :April 5, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Chlorine(Cl)	140	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Daisuke Sakurauchi	April 4, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Daisuke Sakurauchi	April 4, 2023

Notes : N.D.=Not detected MDL=Method Detection Limit

Shinichi Tobe

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The Knights

(No.230310-02179-1)
Date:April 5,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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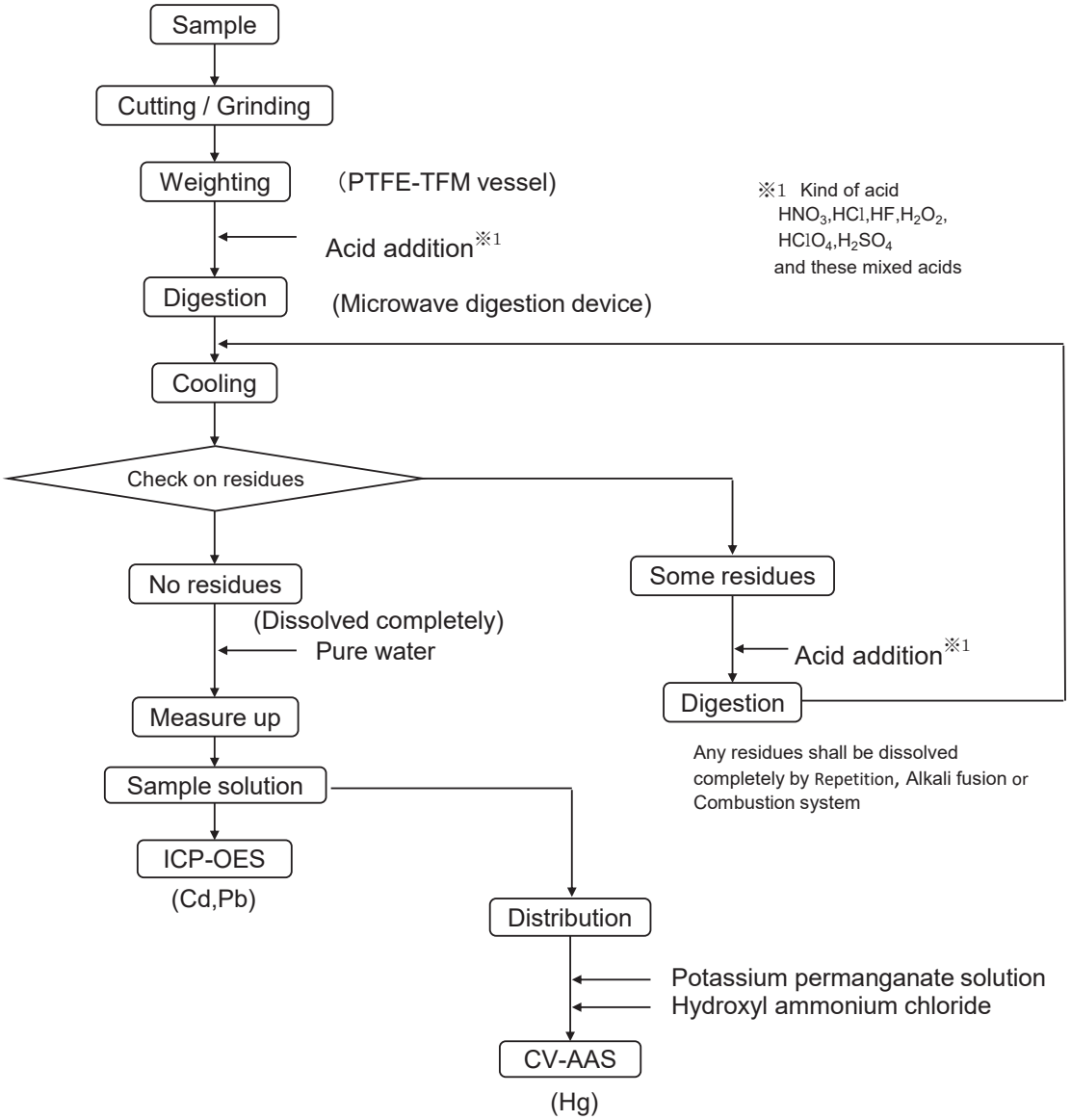
The Knights

(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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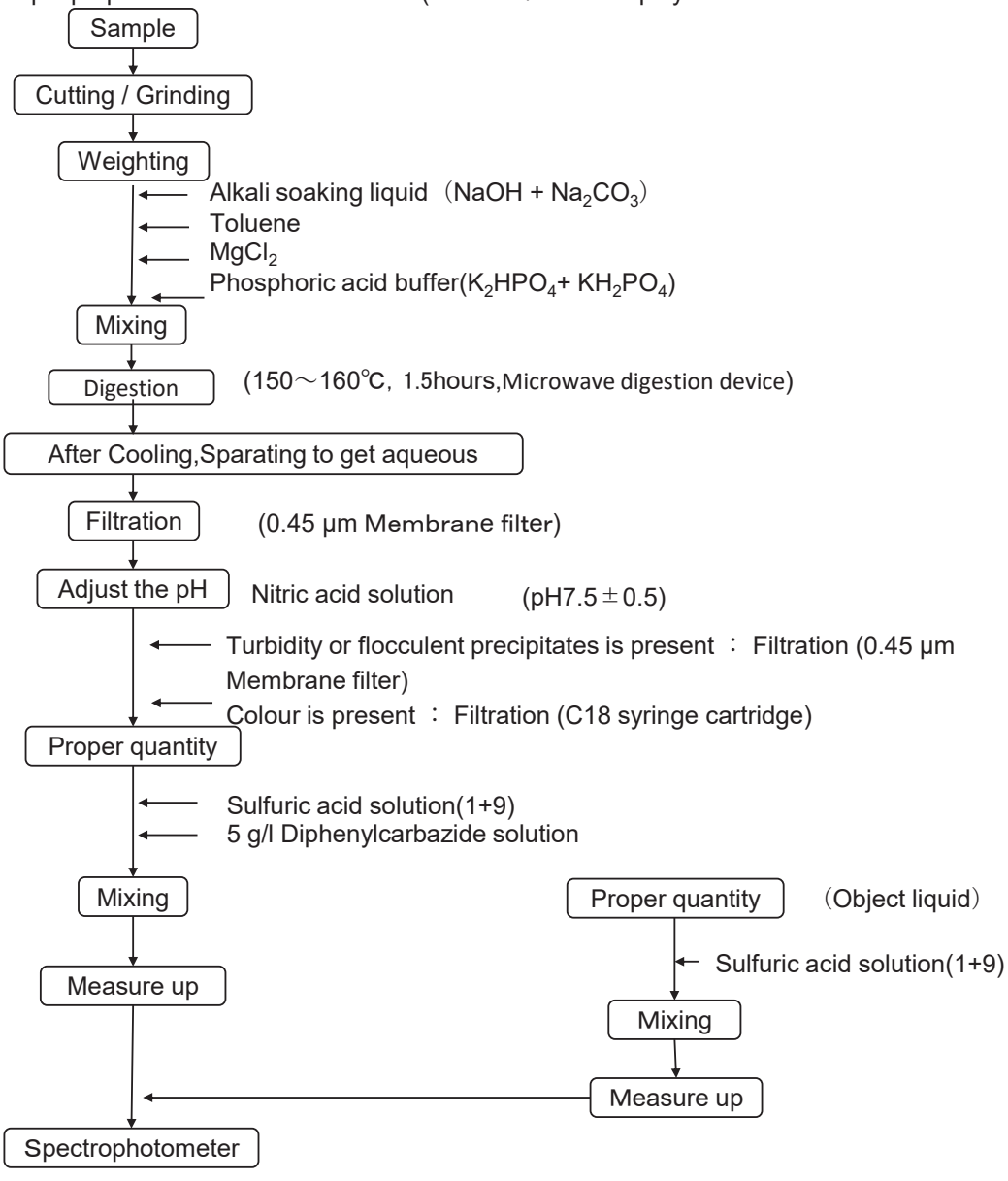
The Knights

(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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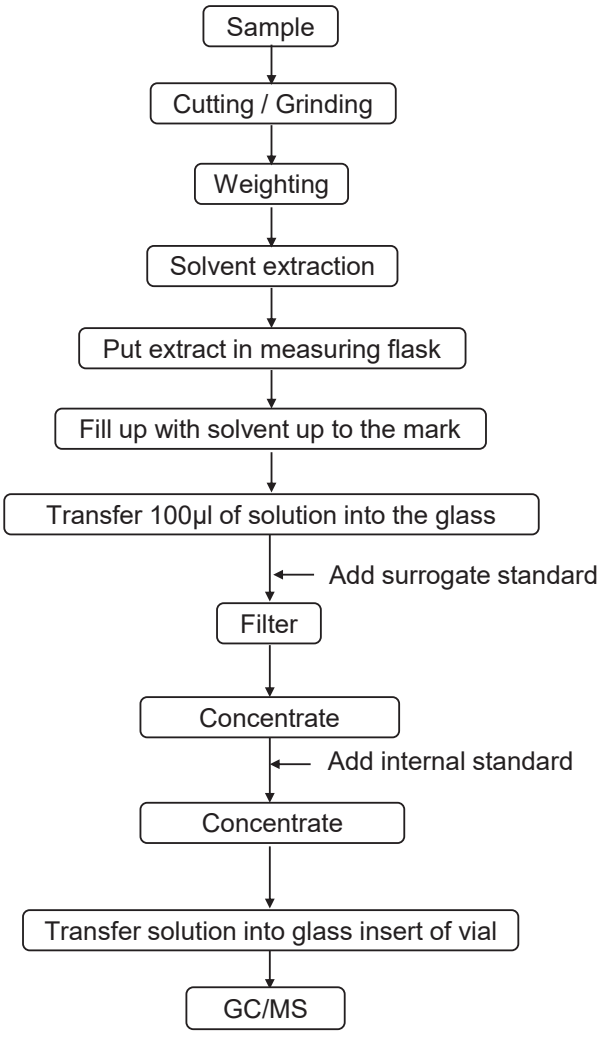
The Knights

(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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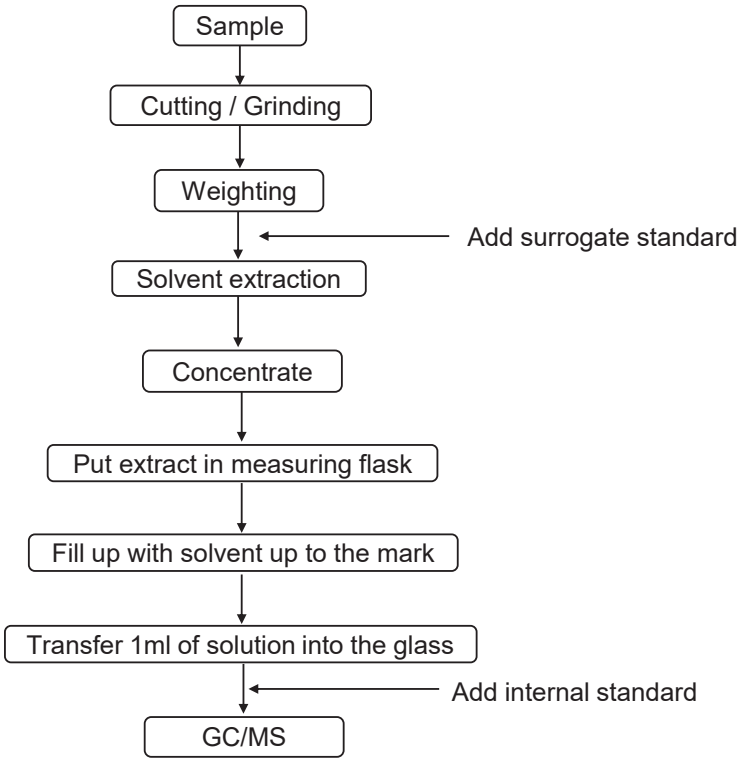
The Knights

(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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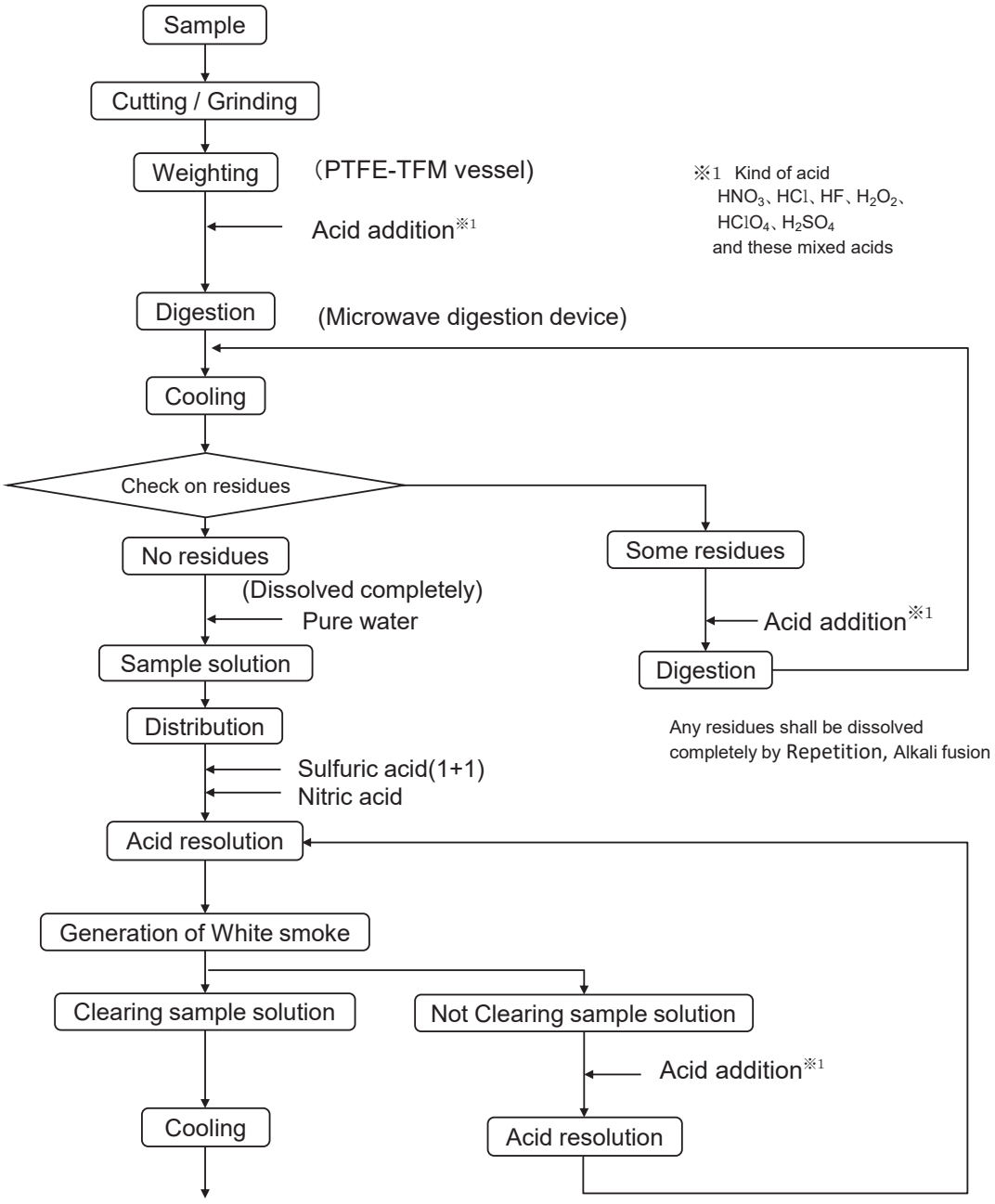
The Knights

(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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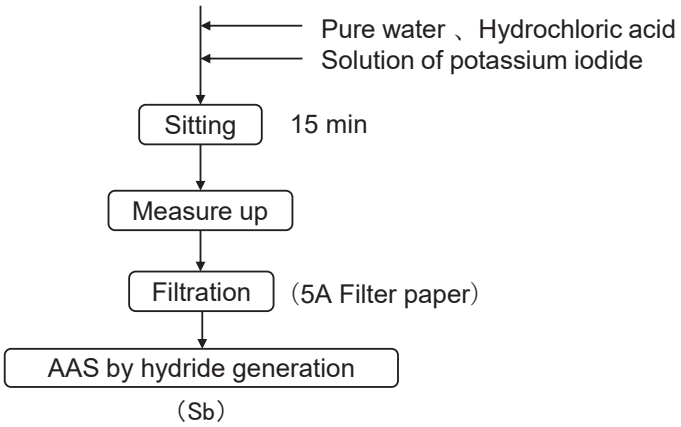

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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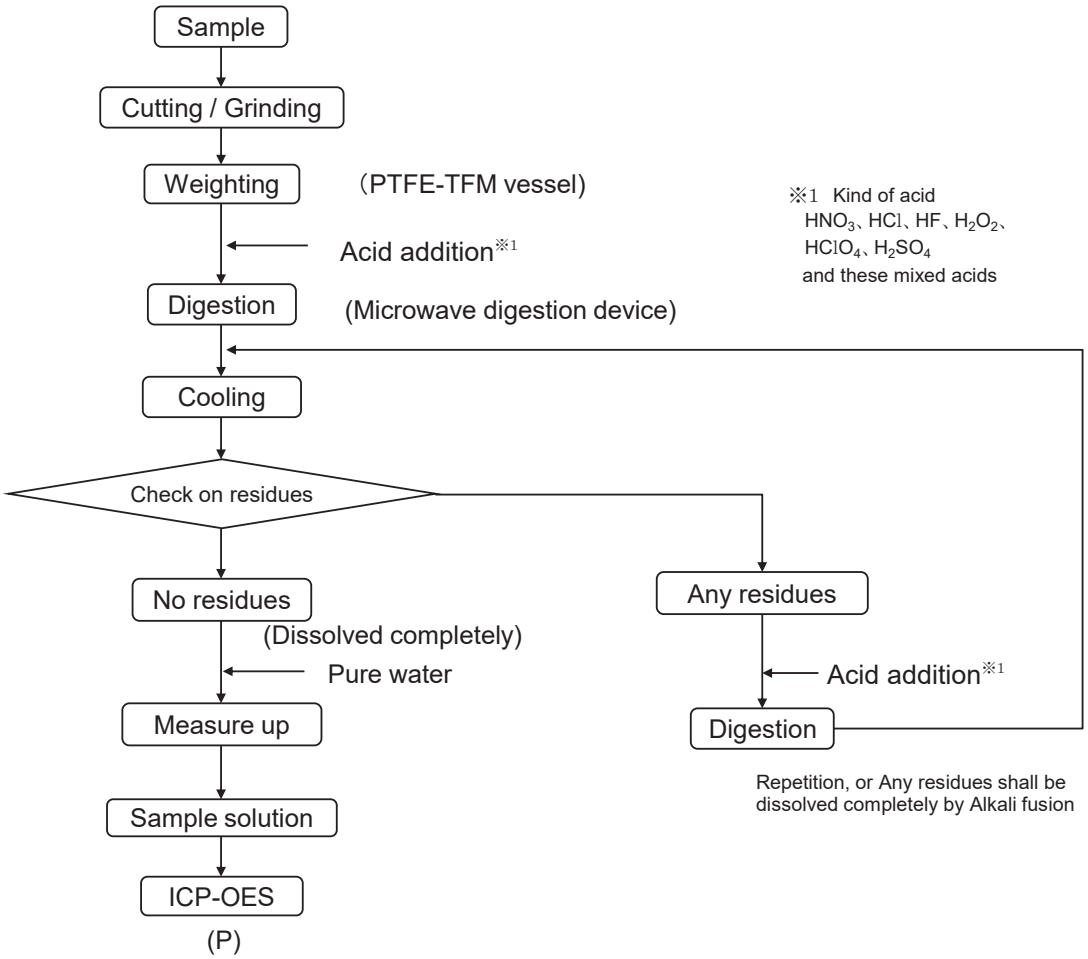
(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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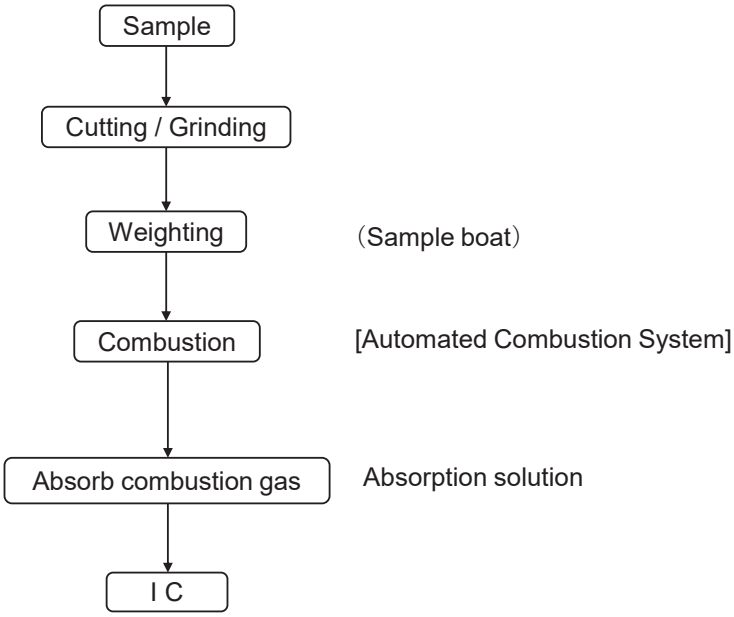
The Knights

(No.230310-02179-1)
Date:April 5,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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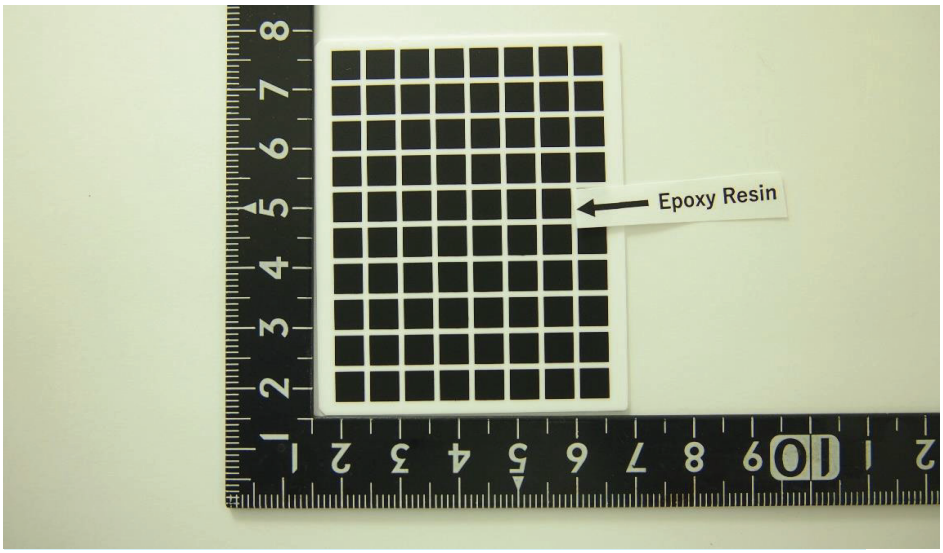
The Knights

(No.230310-02179-1)
Date:April 5,2023



Sample name : Product J-58

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The Knights

J-59-2

(No. 220406-00783-1)
Date :May 9, 2022

Test Report

Client Name : Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address : 401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name : Product J-59-2
Item/Serial number : J-59-2
Test object : Product/Material Test
Testing period : April 7,2022 to May 6,2022
Sample collection method : Bring-in
Additional information : analyze "Ag/Epoxy Resin"only on an alumina substrate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	May 6, 2022
Lead(Pb)	N.D.	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	May 6, 2022
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	May 6, 2022
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-2 Ed.1.0 :2017 Spectrophotometer (SHIMADZU:UV-1650PC) Operator:Genya Ono	May 6, 2022
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	May 6, 2022
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	May 6, 2022
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe
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The Knights

Test Report

(No. 220406-00783-1)
Date :May 9, 2022

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	May 6, 2022
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	May 6, 2022
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	May 6, 2022
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	May 6, 2022
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	May 6, 2022

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

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The Knights

(No.220406-00783-1)
Date:May 9,2022

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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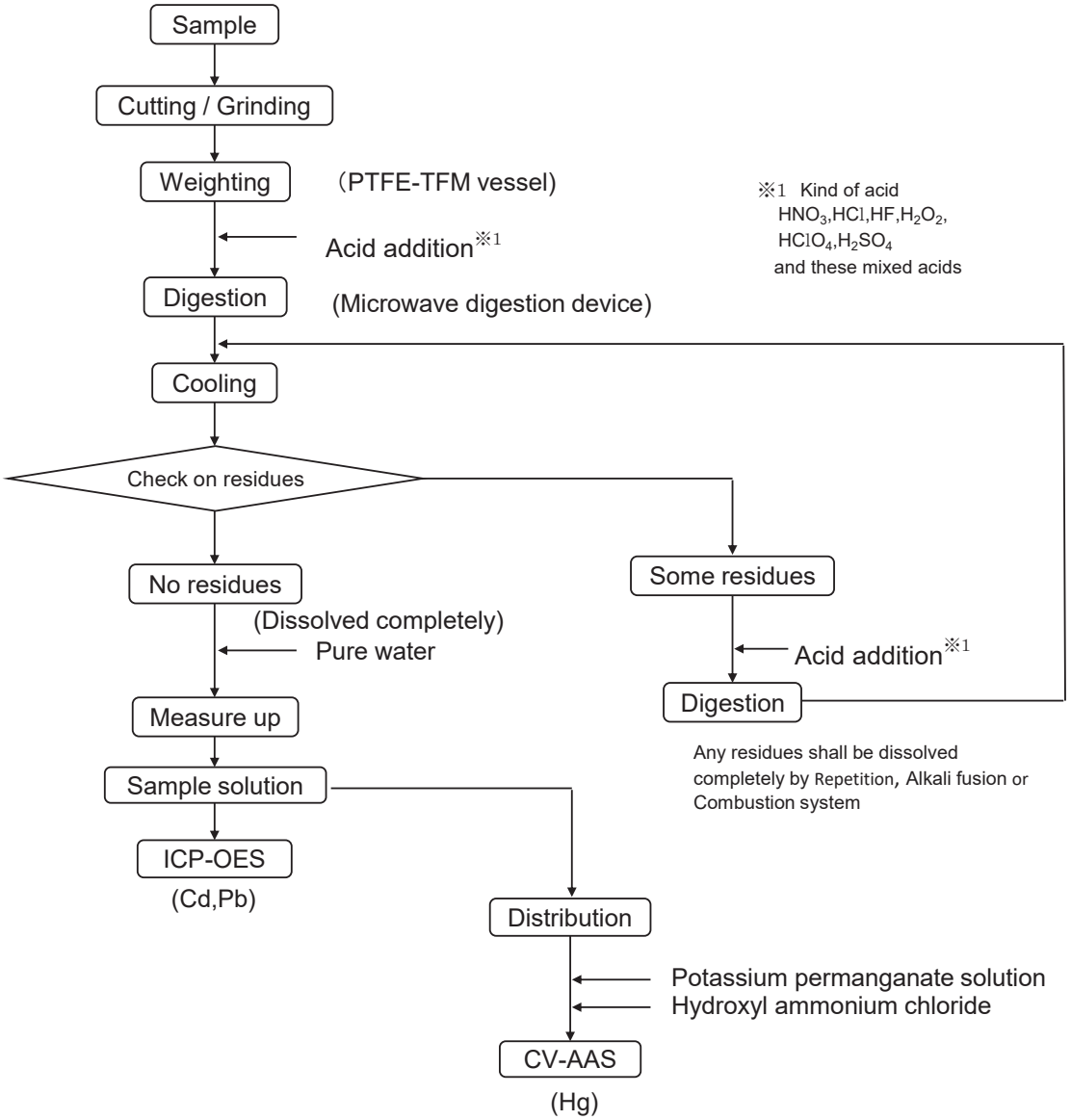
The Knights

(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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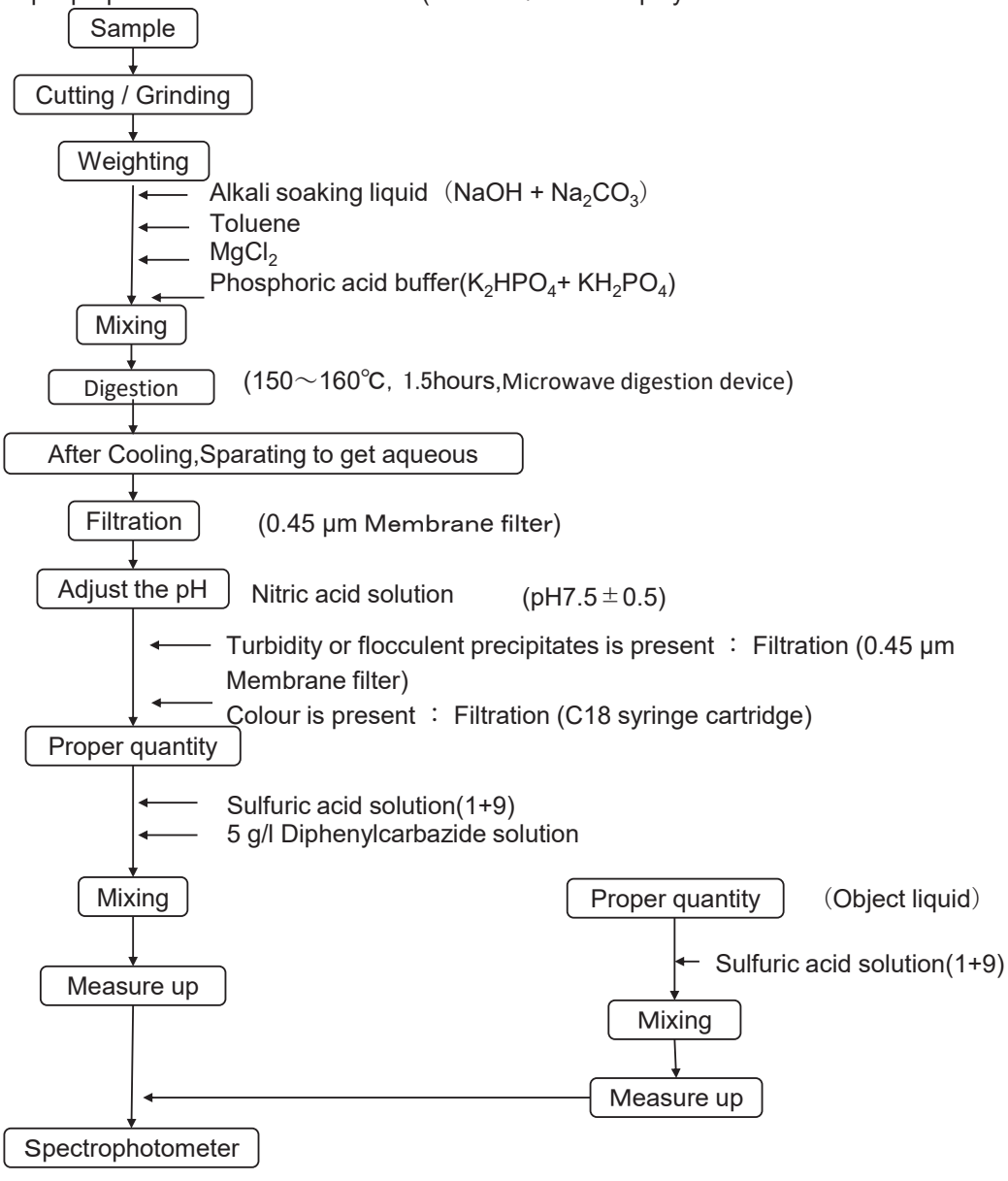
The Knights

(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))

〔Sample preparation：Alkaline extraction(insoluble/unknown polymers and electronics - without Sb)〕



＜Equipment＞

・ UV-VIS spectrophotometer : UV-1650PC(SHIMADZU)

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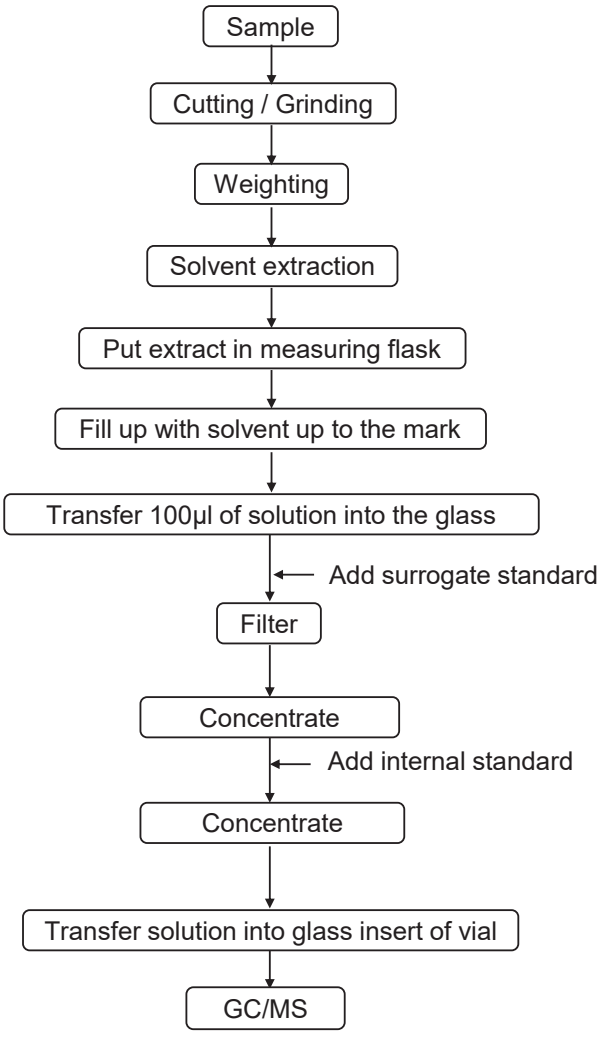
The Knights

(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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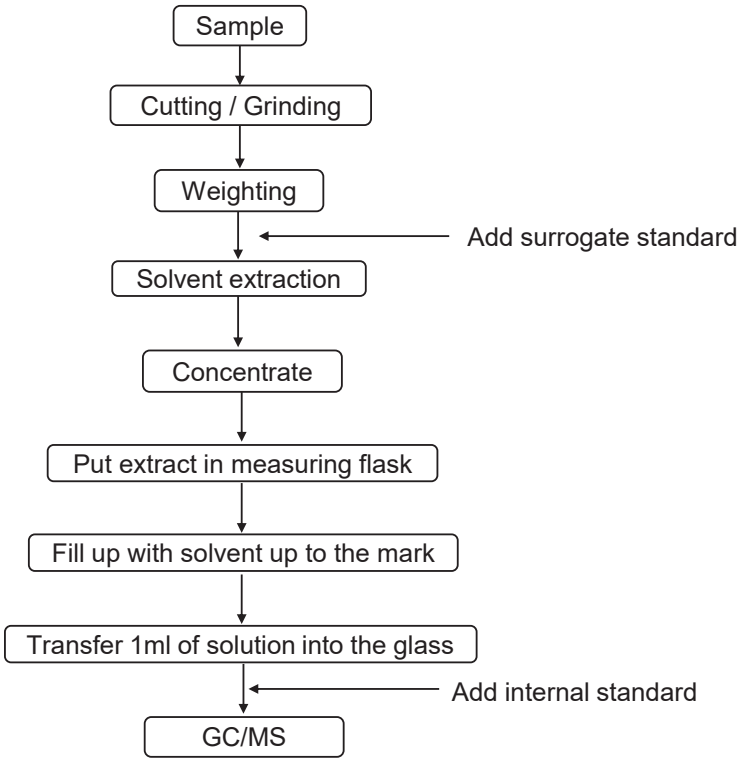
(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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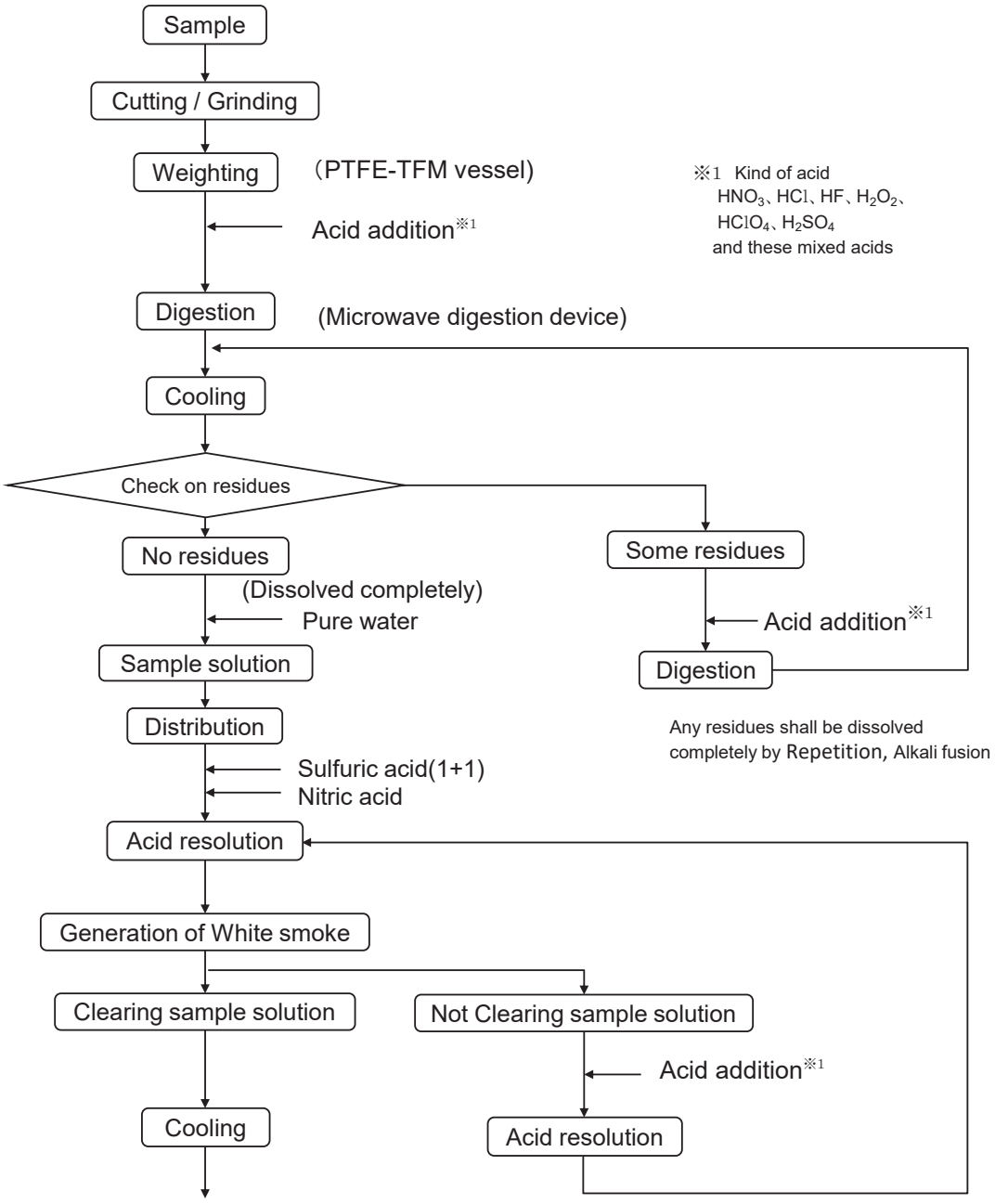
The Knights

(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation : Microwave digestion〕



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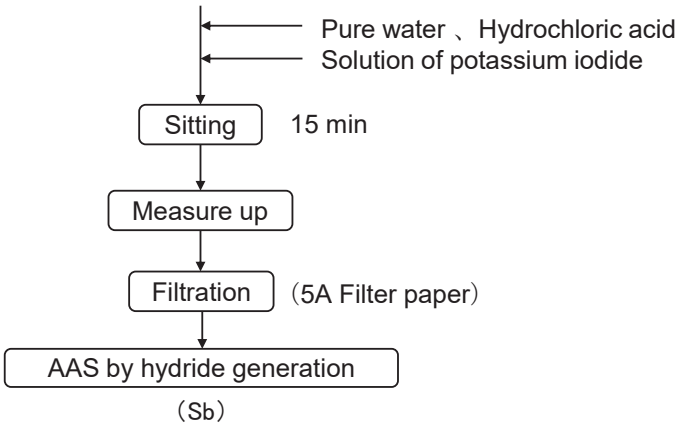

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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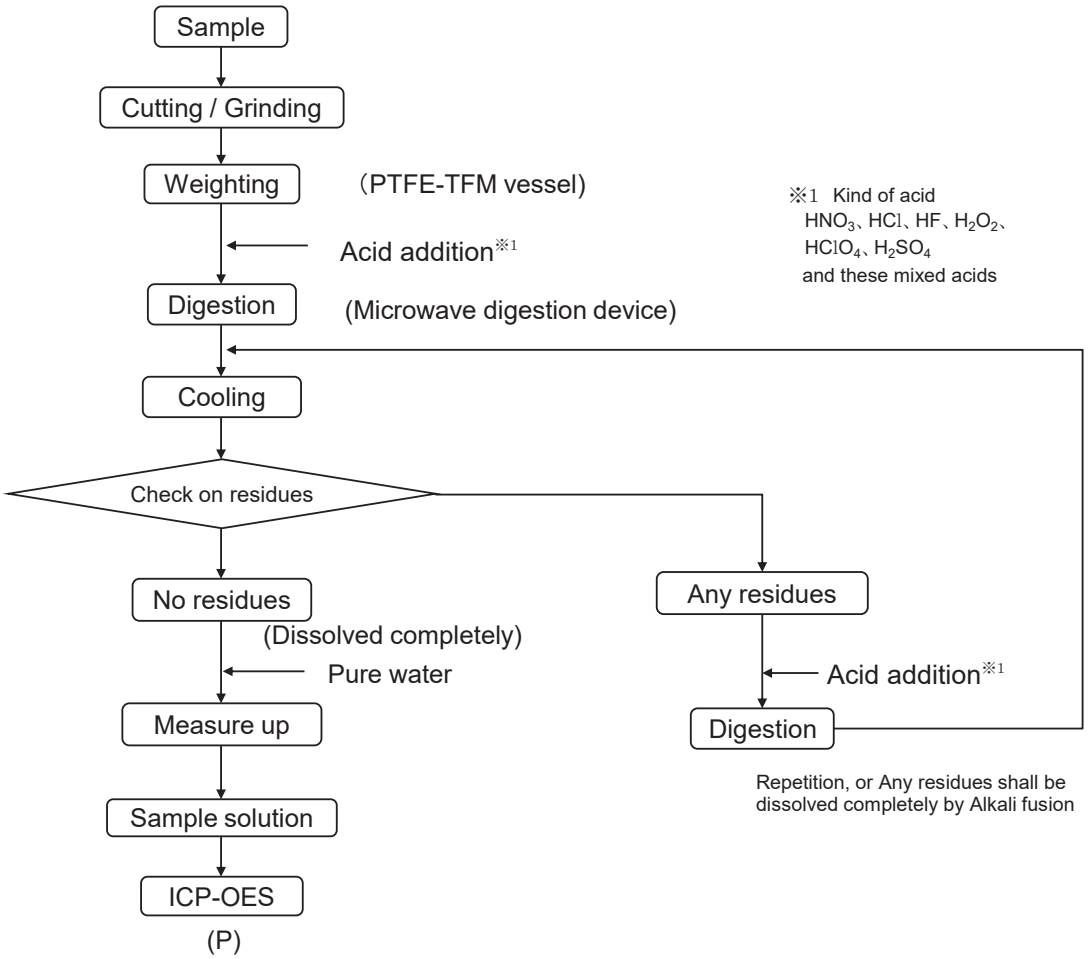
(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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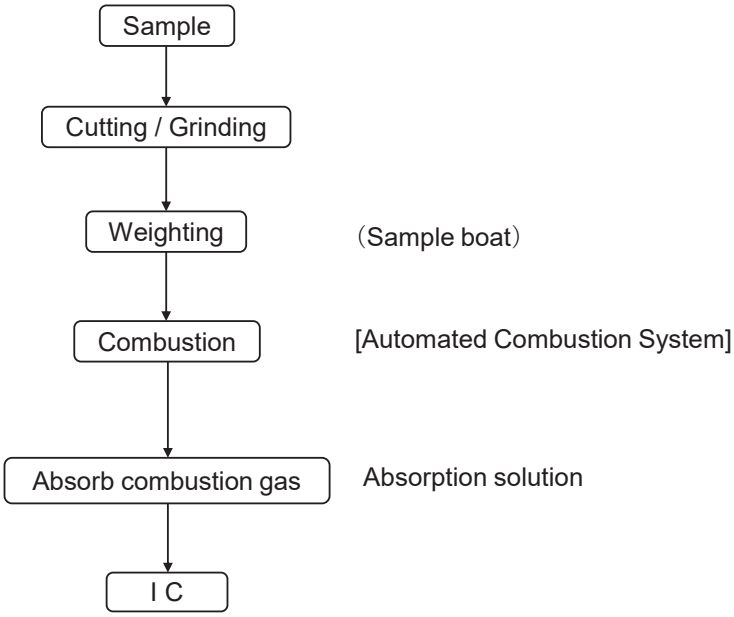
The Knights

(No.220406-00783-1)
Date:May 9,2022

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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The Knights

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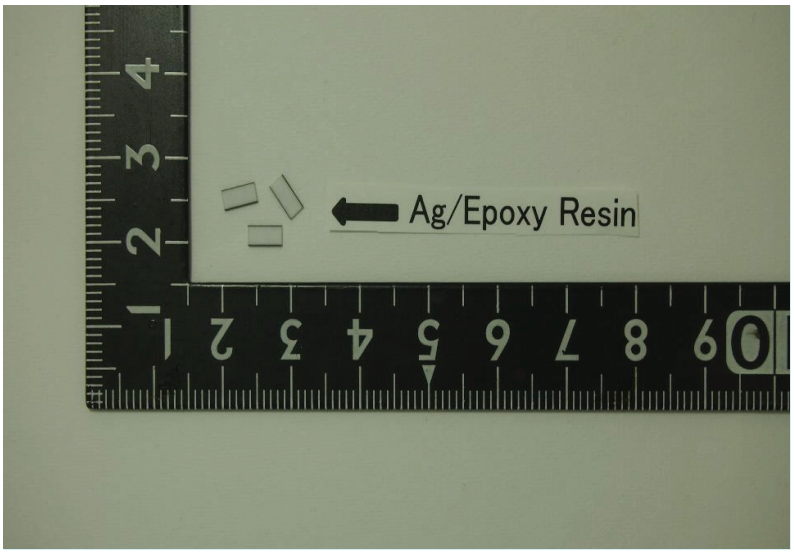
Date:May 9,2022



Sample name : Product J-59-2

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The Knights

J-23

(No. 221219-10276-1)
Date :February 8, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-23
Item/Serial number	:	J-23
Test object	:	Product/Material Test
Testing period	:	December 20,2022 to February 7,2023
Sample collection method	:	Bring-in
Additional information	:	analysis only Nickel plating on Iron plate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Lead(Pb)	N.D.	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-1 Ed.1.0 :2015 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	February 7, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	February 7, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	February 7, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

Shinichi Tobe
Environmental Certified public Measurers
NAITOH Environmental Science Co.,Ltd.

Mari Sanada
デジタル署名者 : Mari Sanada
付 : 2023.02.08 16:05:53 +09'00'

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The Knights

Test Report

(No. 221219-10276-1)
Date :February 8, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	February 7, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	February 7, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	February 7, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Sakiko Nomura	February 7, 2023

Notes : N.D.=Not detected (<MDL) MDL= Method Detection Limit

Shinichi Tobe

Shinichi Tobe
Environmental Certified public Measurers
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The Knights

(No.221219-10276-1)
Date:February 8,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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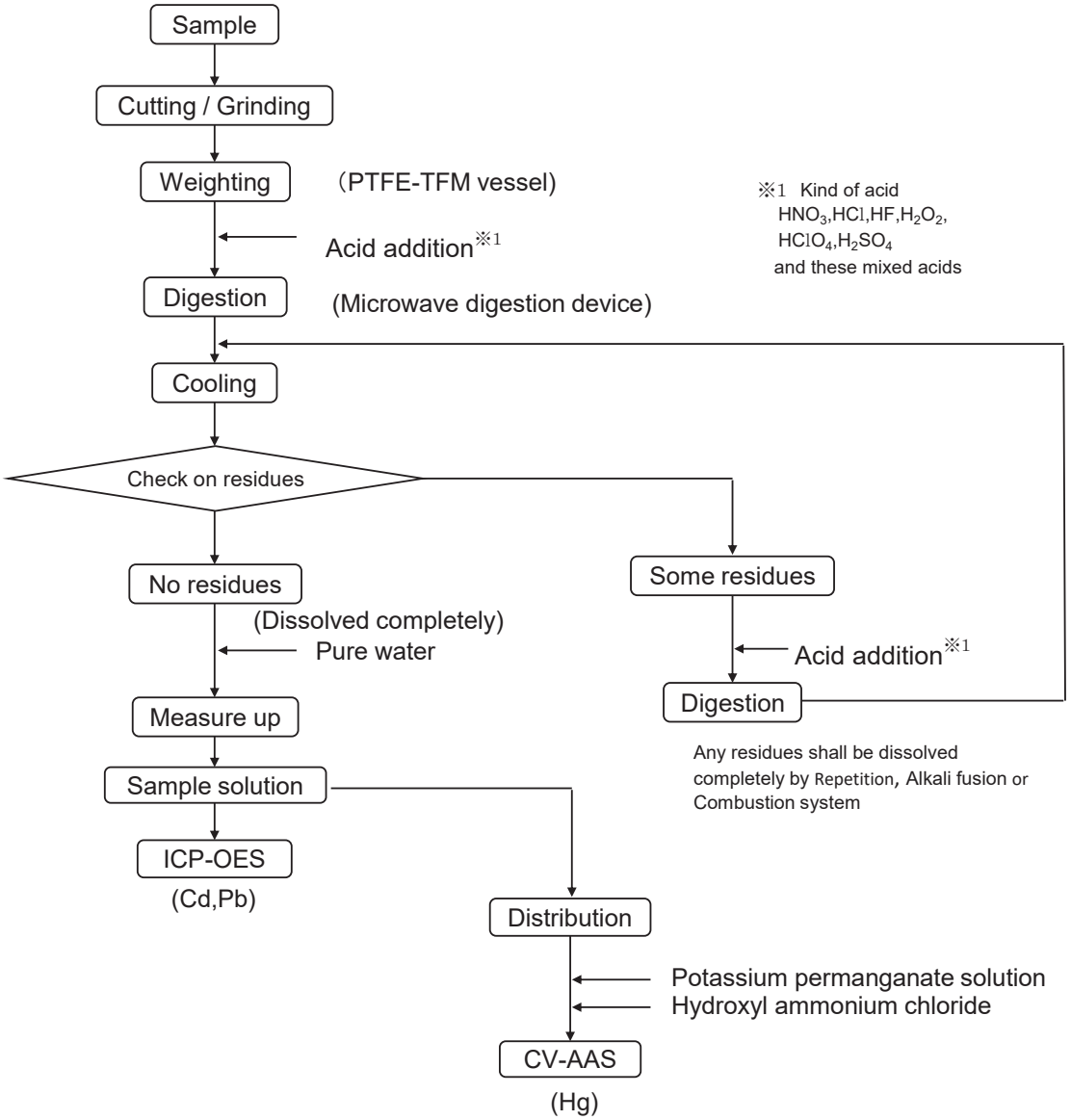
The Knights

(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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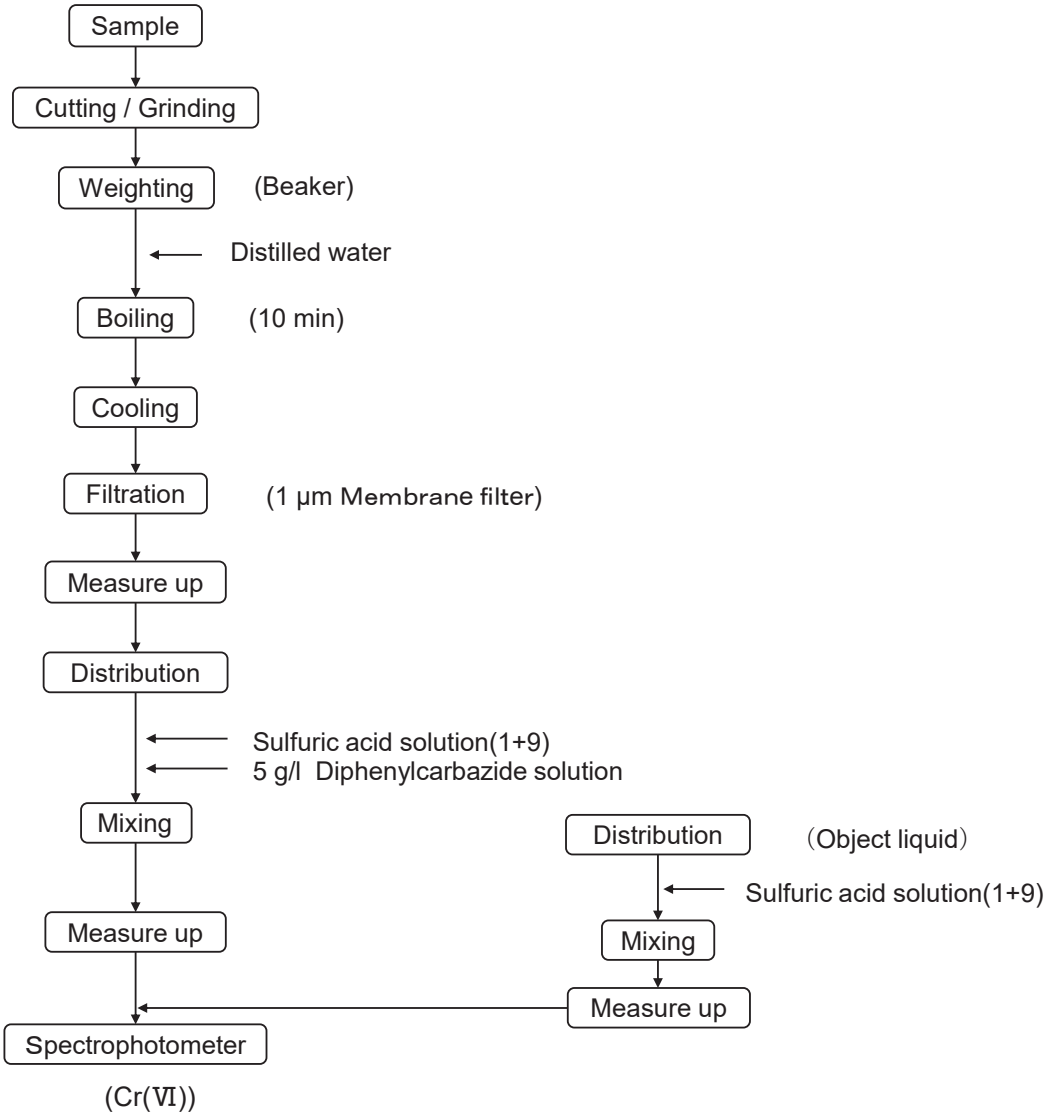
The Knights

(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))
〔Sample preparation：Boiling water extraction〕



＜Equipment＞
・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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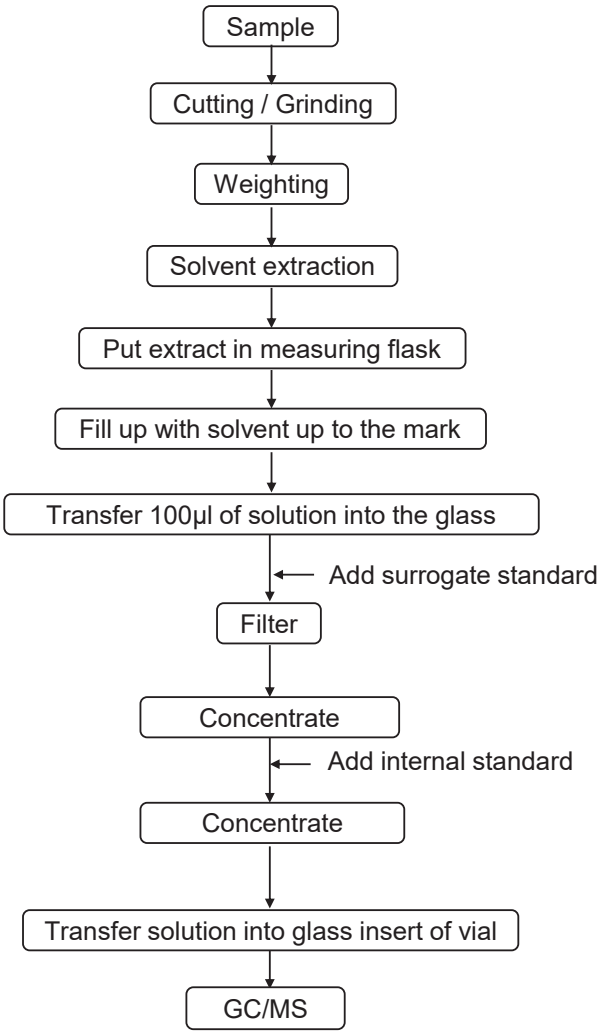
The Knights

(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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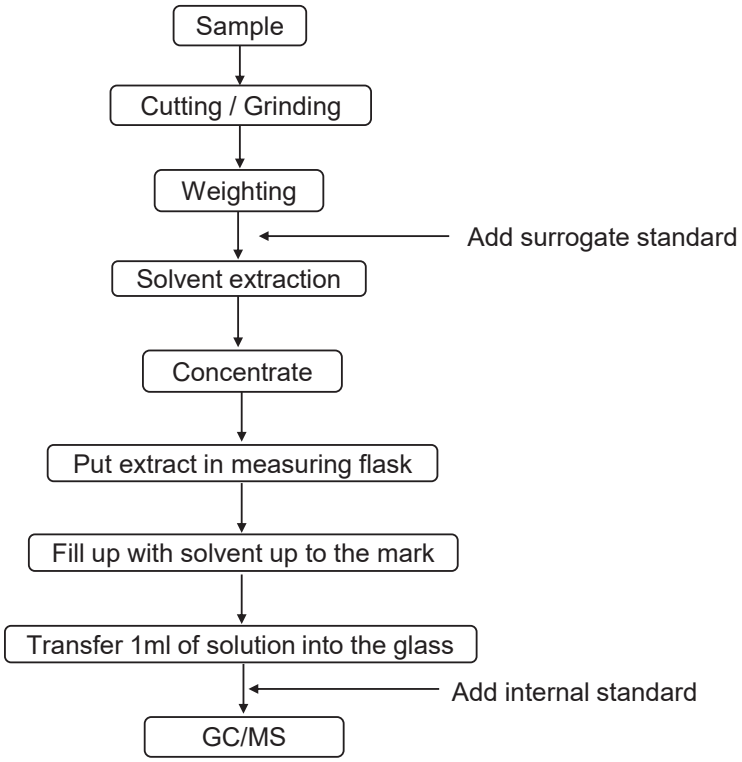
The Knights

(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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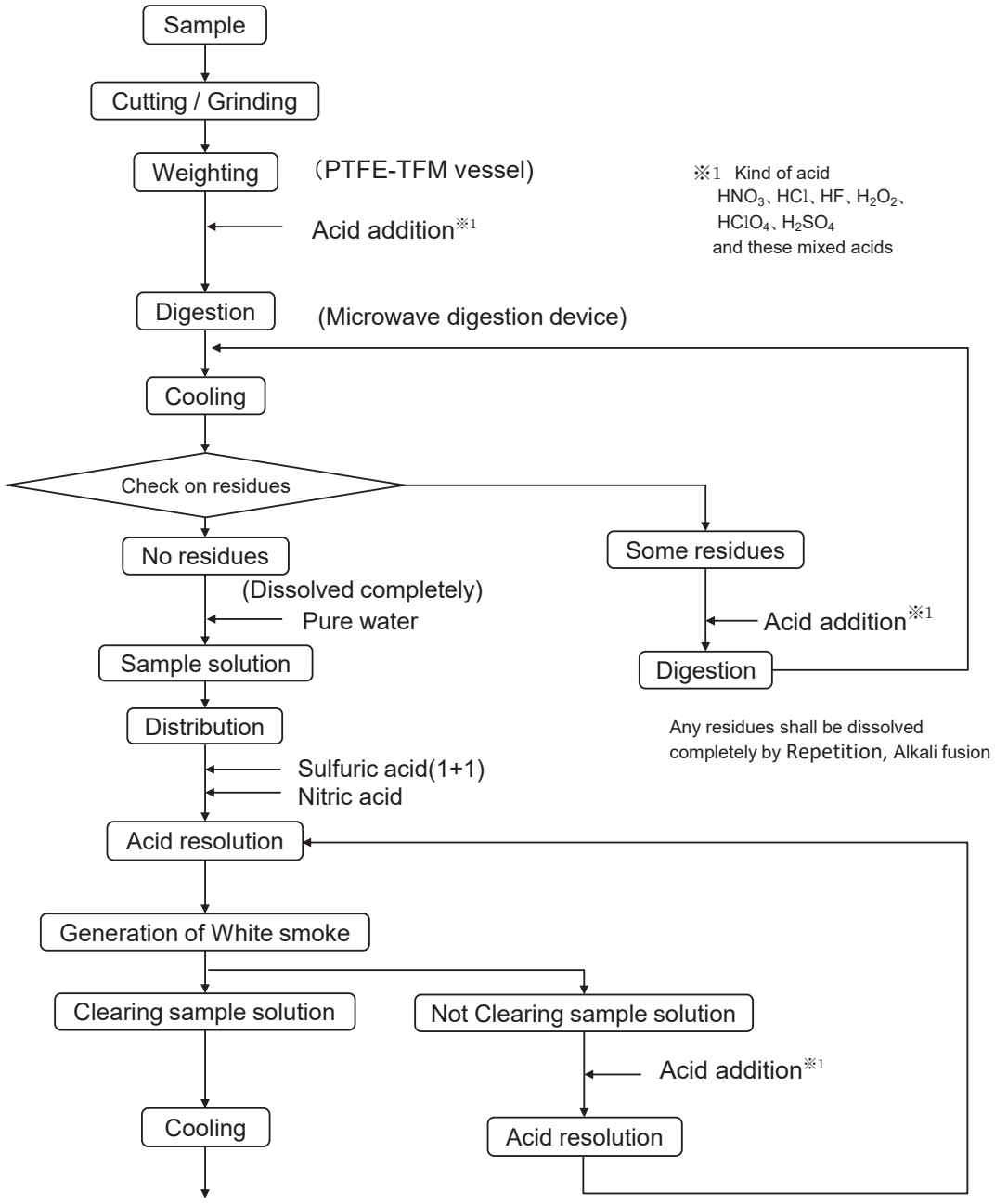
The Knights

(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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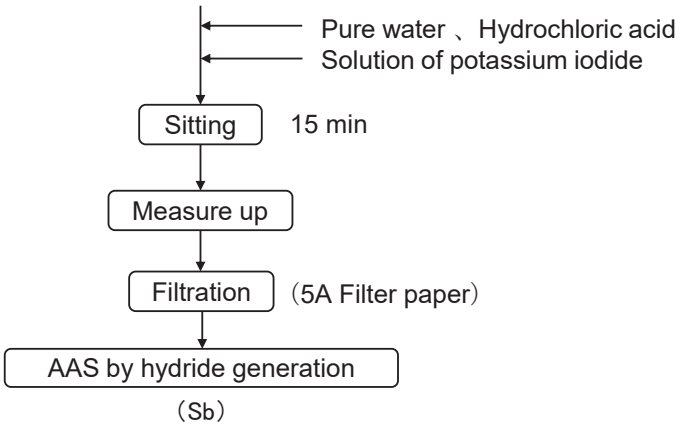

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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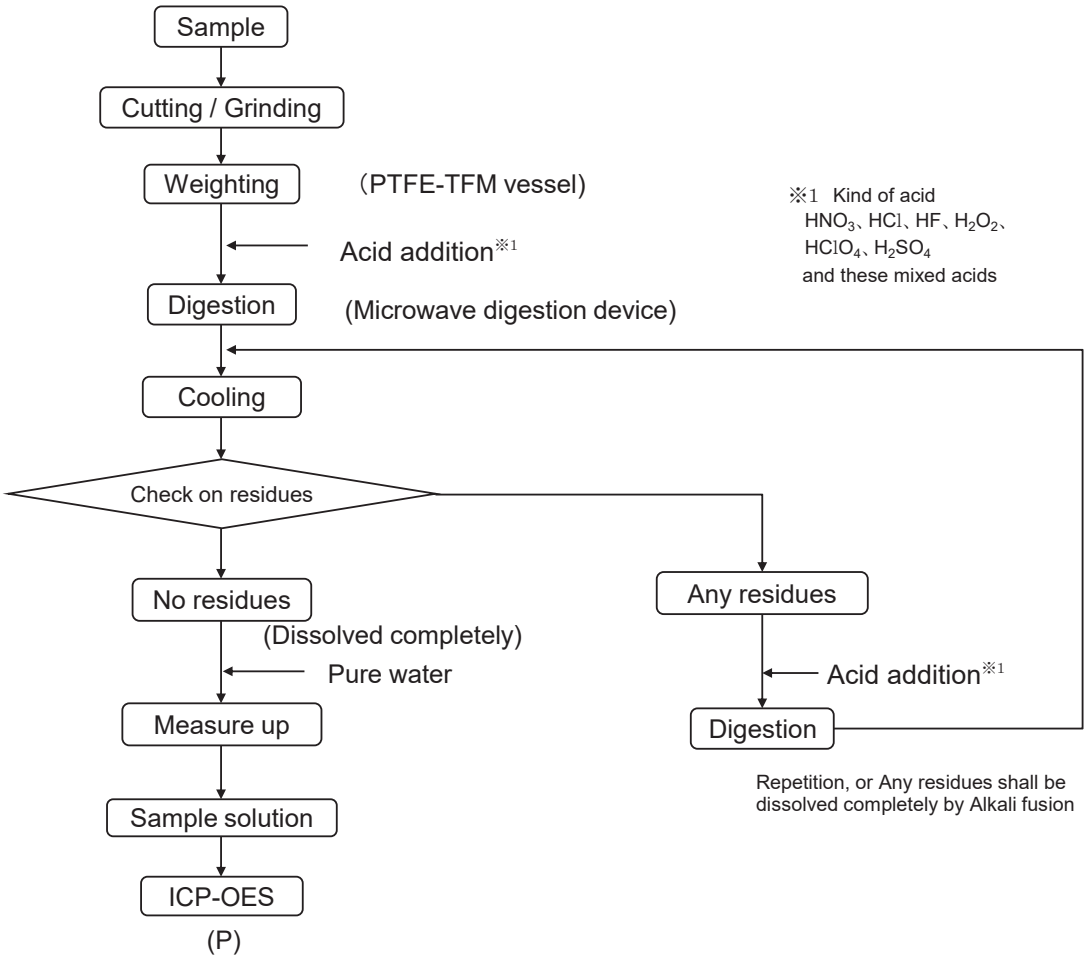
(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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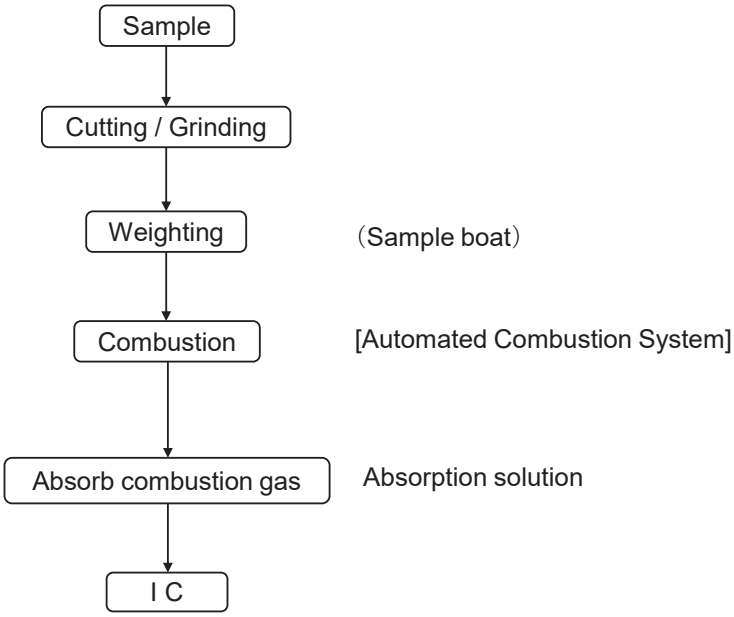
The Knights

(No.221219-10276-1)
Date:February 8,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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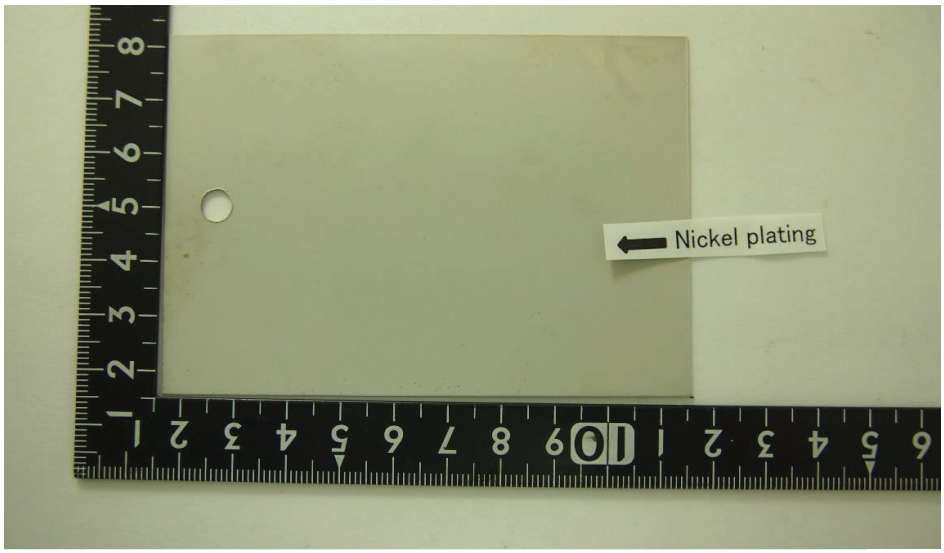
Date:February 8,2023



Sample name : Product J-23

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The Knights

J-21

(No. 230310-02160-1)

Date :April 5, 2023

Test Report

Client Name	:	Device Solutions Business Division, Panasonic Industry Co.,Ltd.
Client address	:	401 Sadamasa-cho, Fukui City 910-8502, Japan
Sample name	:	Product J-21
Item/Serial number	:	J-21
Test object	:	Product/Material Test
Testing period	:	March 13,2023 to April 4,2023
Sample collection method	:	Bring-in
Additional information	:	analysis only Tin plating on ironl plate.

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Cadmium(Cd)	N.D.	0.5	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Lead(Pb)	N.D.	2	Reference to IEC62321-5 Ed.1.0:2013 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Mercury(Hg)	N.D.	0.2	Reference to IEC62321-4:2013/AMD1,Ed.1.0:2017 CV-AAS (NIC:RA-3) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Hexavalent chromium(Cr(VI))	N.D.	2	Reference to IEC 62321-7-1 Ed.1.0 :2015 Spectrophotometer (SHIMADZU:UV-1800) Operator:Genya Ono	April 4, 2023
Polybrominated biphenyl(PBB)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	April 4, 2023
Polybrominated diphenyl Ether(PBDE)	N.D.	5	Reference to IEC 62321-6 Ed.1.0:2015 GC/MS (Agilent Technologies:7890/5975C) Operator:Yoshio Soutome	April 4, 2023
Di(2-ethylhexyl) phthalate (DEHP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Dibutyl phthalate (DBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Benzyl butyl phthalate (BBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Di-isononyl phthalate (DINP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Di-isodecyl phthalate (DIDP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Di-n-octyl phthalate (DNOP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023

Shinichi Tobe

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Environmental Certified public Measurers
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Mari Sanada
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The Knights

Test Report

(No. 230310-02160-1)

Date :April 5, 2023

Test Results

Unit : mg/kg(ppm)

Test Item	Test Result	MDL	Test Method	Test Date
Di-isobutyl phthalate (DIBP)	N.D.	50	Reference to IEC62321-8 Ed. 1.0:2017 (Sample preparation: Solvent extraction) GC/MS (Agilent Technologies:7890/5977B) Operator:Yoshio Soutome	April 4, 2023
Antimony (Sb)	N.D.	10	Reference to US EPA 3052:1996 AAS by hydride generation (SHIMAZU:AA-7000) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
phosphorus (P)	N.D.	50	Reference to US EPA 3052:1996 ICP-OES (Agilent Technologies:5100) Operator:Hisanaga Takeshita *The sample dissolved completely	April 4, 2023
Chlorine(Cl)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Daisuke Sakurauchi	April 4, 2023
Bromine(Br)	N.D.	50	Reference to BS EN 14582:2016 Combustion System(Nittoseiko Analytech:AQF-2100H) Ion Chromatograph(thermo:INTEGRION) Operator:Daisuke Sakurauchi	April 4, 2023

Notes : N.D.＝Not detected MDL=Method Detection Limit

For the analysis of hexavalent chromium in metals, the unit of detected concentration is expressed in terms of μg/cm² converted to ppm.MDL of Hexavalent chromium(Cr(VI)) :0.10 μg/cm²

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(No.230310-02160-1)
Date:April 5,2023

Test Report

Test results of PBB & PBDE congeners in the sample

Test Item	Result (mg/kg(ppm))
Monobromobiphenyl	N. D.
Dibromobiphenyl	N. D.
Tribromobiphenyl	N. D.
Tetrabromobiphenyl	N. D.
Pentabromobiphenyl	N. D.
Hexabromobiphenyl	N. D.
Heptabromobiphenyl	N. D.
Octabromobiphenyl	N. D.
Nonabromobiphenyl	N. D.
Decabromobiphenyl	N. D.
Sum of PBB (Mono to Deca)	N. D.
Monobromodiphenyl ether	N. D.
Dibromodiphenyl ether	N. D.
Tribromodiphenyl ether	N. D.
Tetrabromodiphenyl ether	N. D.
Pentabromodiphenyl ether	N. D.
Hexabromodiphenyl ether	N. D.
Heptabromodiphenyl ether	N. D.
Octabromodiphenyl ether	N. D.
Nonabromodiphenyl ether	N. D.
Decabromodiphenyl ether	N. D.
Sum of PBDE (Mono to Deca)	N. D.

Note:

1. Method Detection Limit for each congener is 5 mg/kg (ppm)
2. N. D. = Not detected

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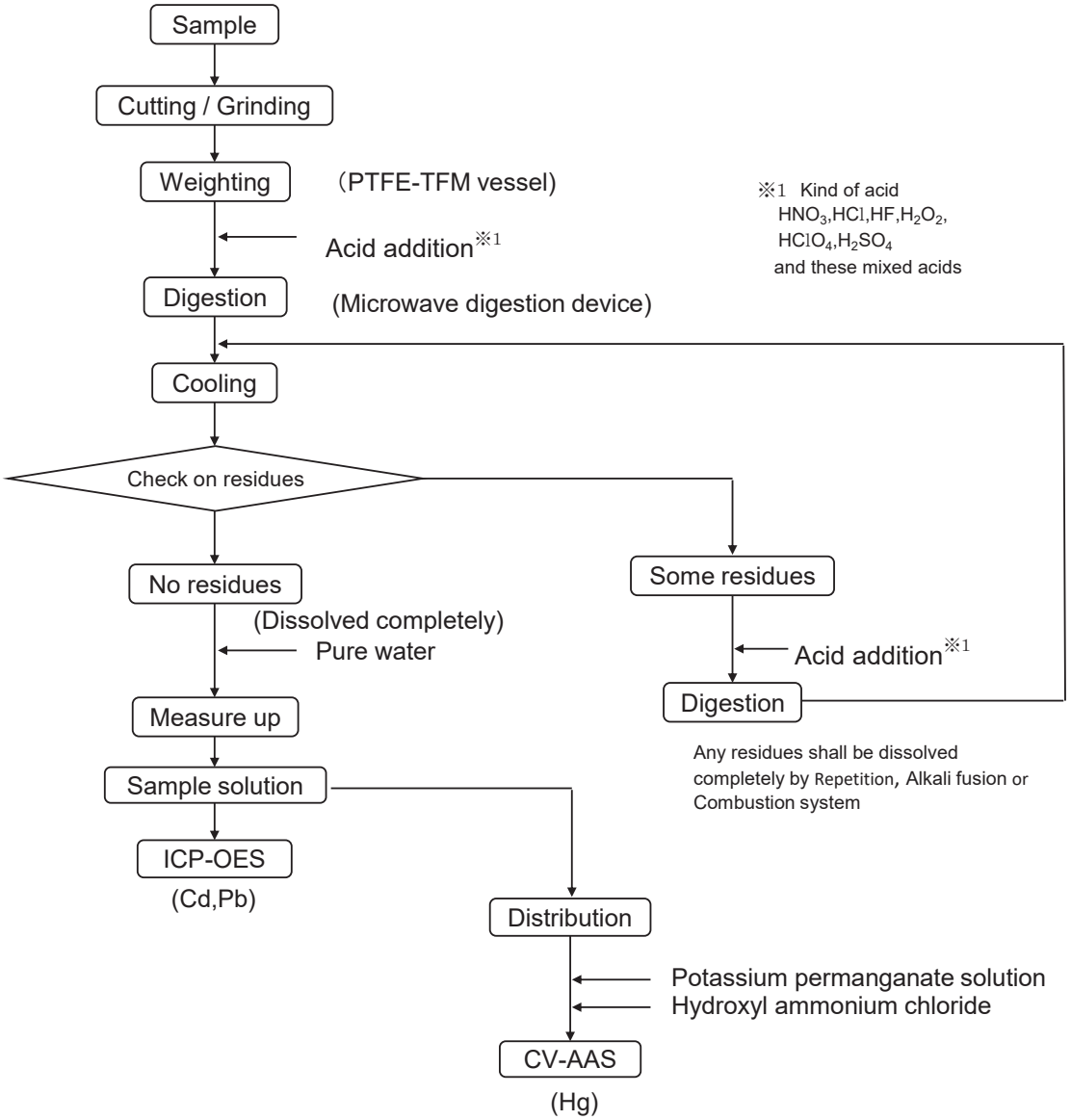
(No.230310-02160-1)
Date:April 5,2023

Test method - Flow chart

・ Cadmium(Cd)・Lead(Pb)・Mercury(Hg)

〔Sample preparation：Microwave digestion〕



＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- ICP-OES：5100(Agilent Technologies)
- CV-AAS：RA-3(NIPPON INSTRUMENTS)

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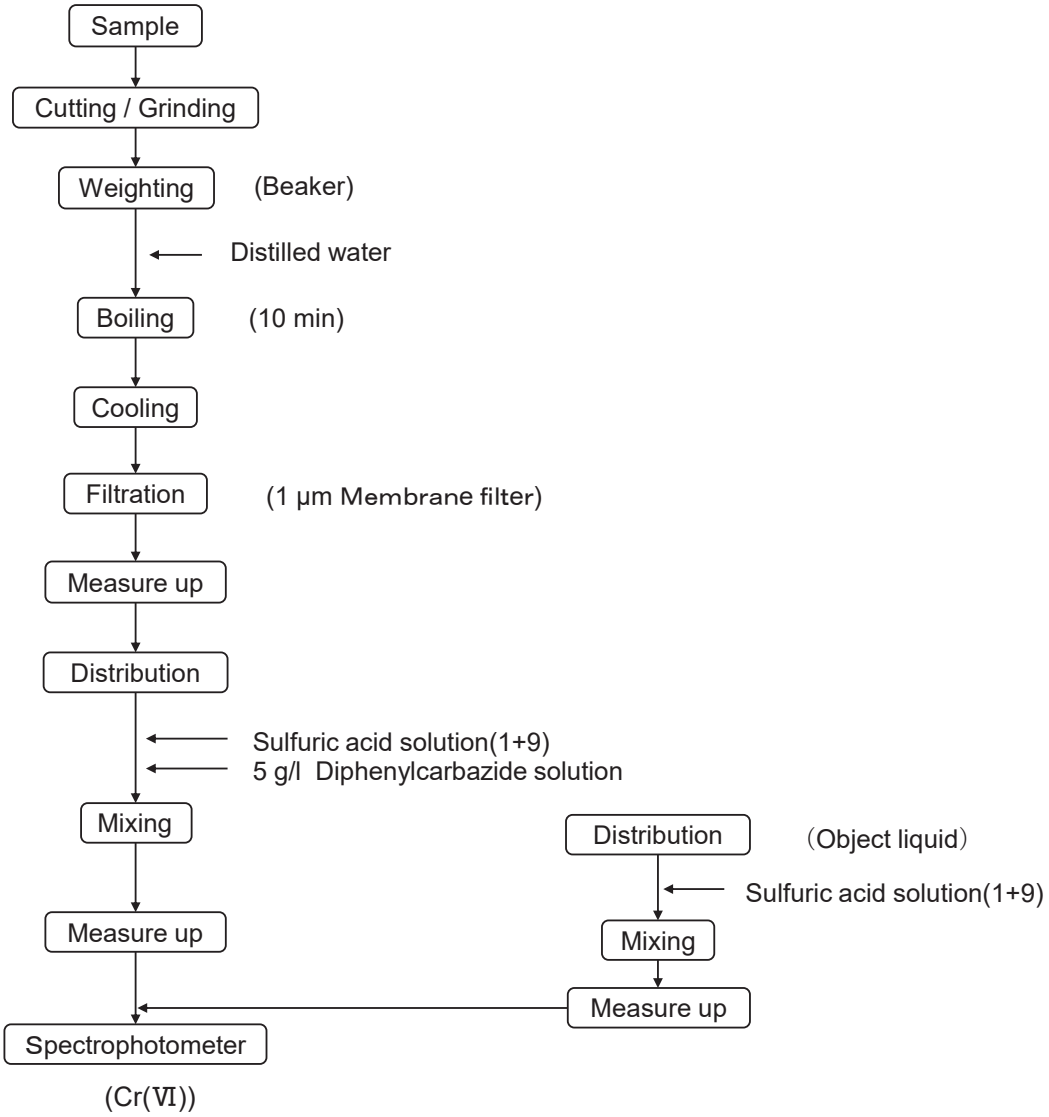
Test method - Flow chart

・ Hexavalent Chromium(Cr(Ⅵ))
〔Sample preparation：Boiling water extraction〕



＜Equipment＞
・ UV-VIS spectrophotometer : UV-1800(SHIMADZU)

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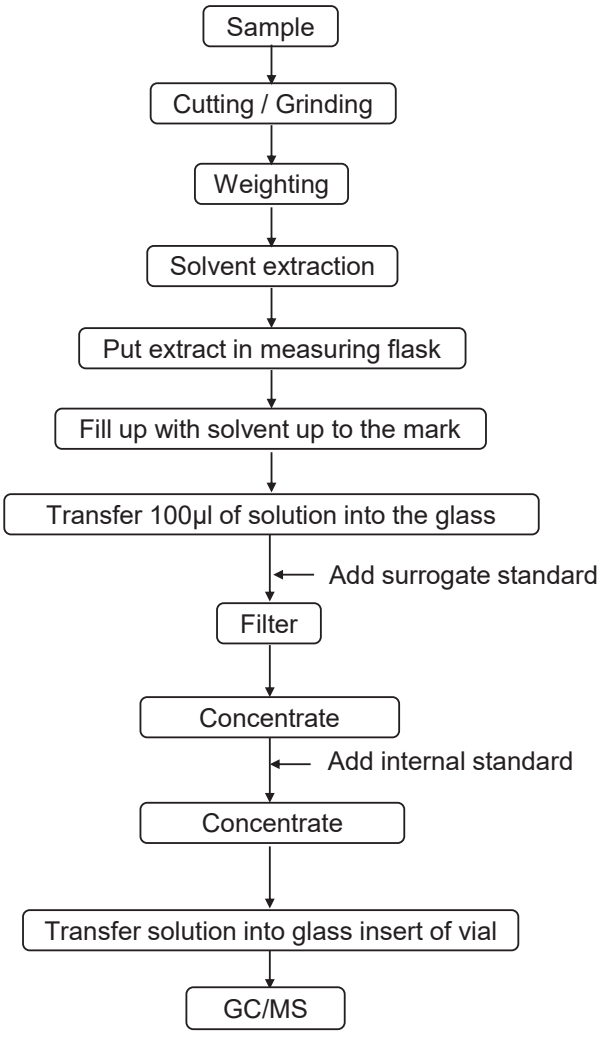
Test method - Flow chart

・ PBB・PBDE

〔Sample preparation：Solvent extraction〕



（PBB・PBDE）

＜Equipment＞

・ GC/MS	:	7890/5975C (Agilent Technologies)
Mass analyzer		Quadrupole
Ionization method		Electron Ionization (EI), 70eV
Data acquisition modus		Selected Ion Monitoring（SIM）
GC column		Agilent DB-5ht, length 15m, internal diameter 0.25mm, film thickness0.1µm

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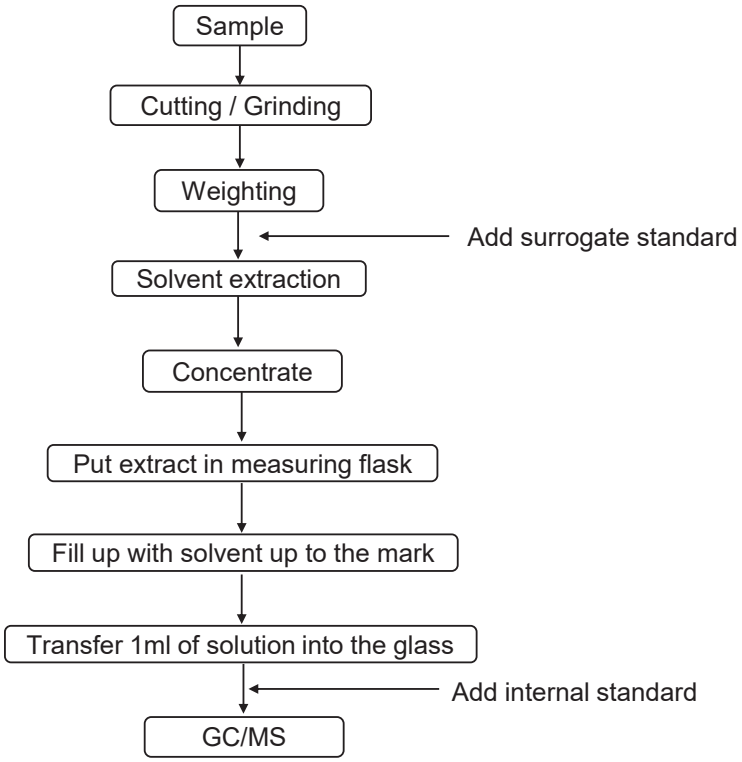
(No.230310-02160-1)
Date:April 5,2023

Test method - Flow chart

・ Phthalates

〔Sample preparation：Solvent extraction〕



（Phthalates ）

＜Equipment＞

・ GC/MS：7890/5977B (Agilent Technologies)

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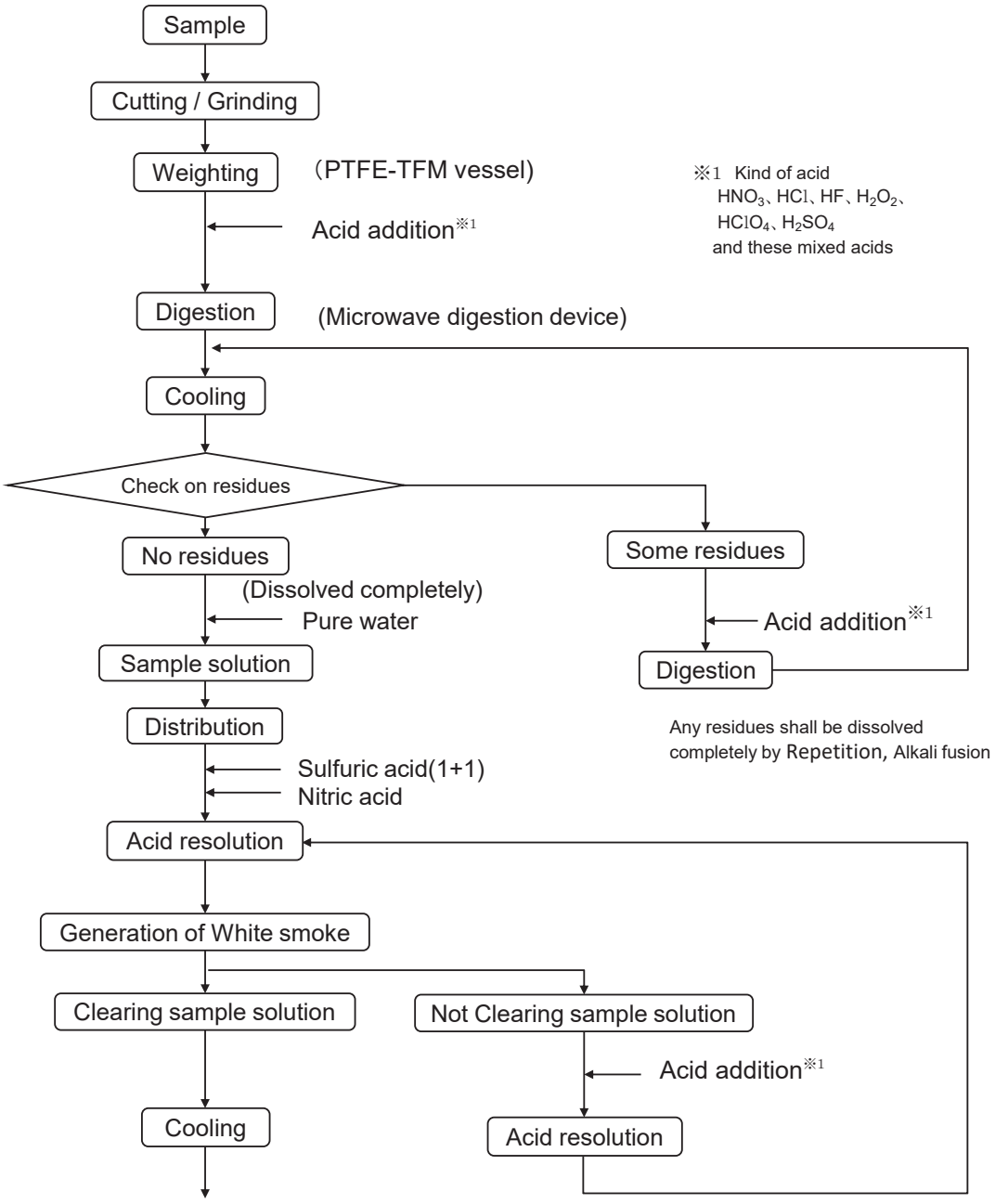
Test method - Flow chart

・ Antimony（Sb）

〔Sample preparation ： Microwave digestion〕



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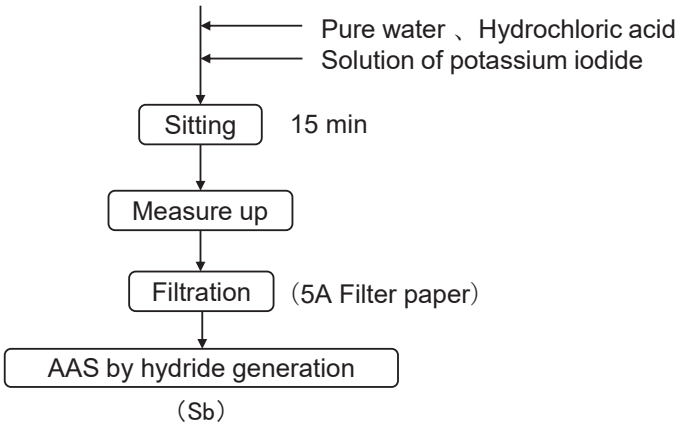

＜Equipment＞

- Microwave digestion device：START D(MILESTONE)
- AAS by hydride generation：AA-7000(SHIMADZU)

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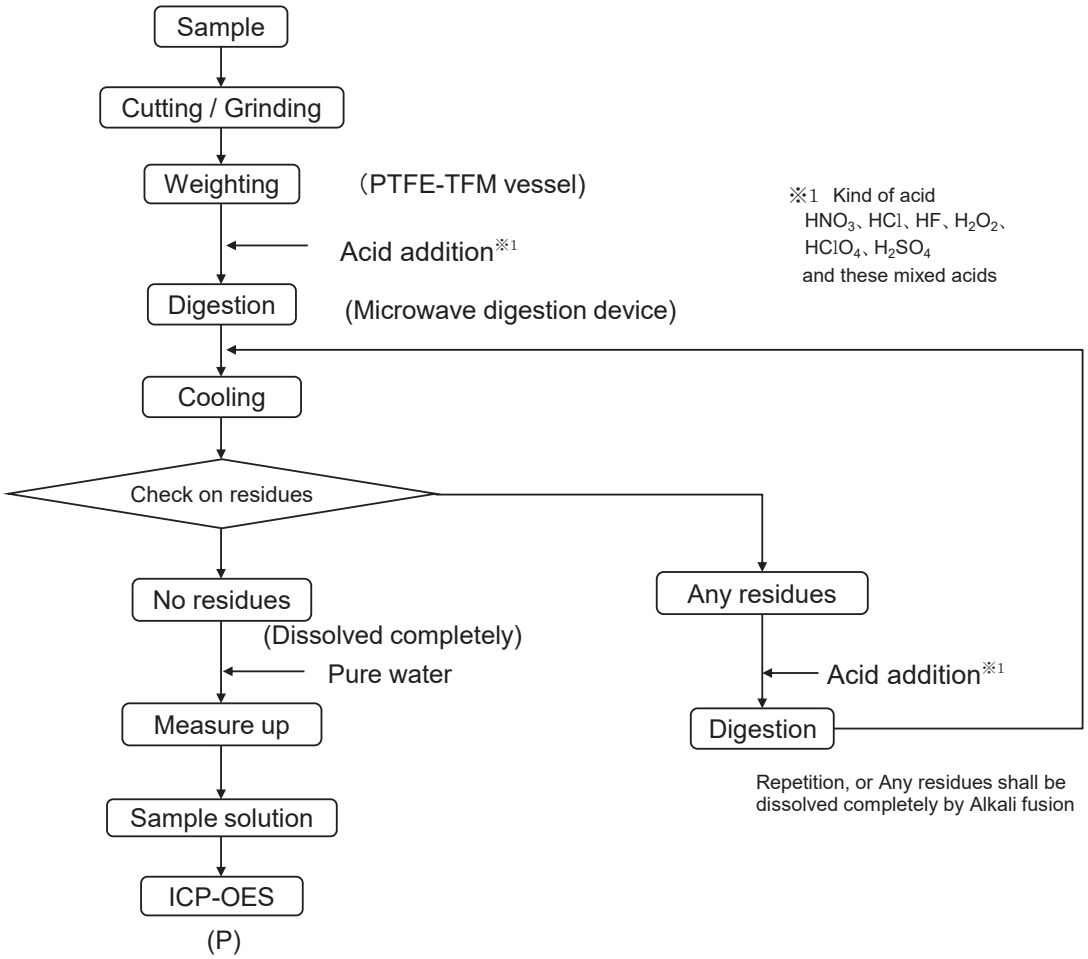
(No.230310-02160-1)
Date:April 5,2023

Test method - Flow chart

・ Phosphorus(P)

〔Sample preparation : Microwave digestion〕



＜Equipment＞

・ Microwave digestion device：START D(MILESTONE)
・ ICP-OES：5100(Agilent Technologies)

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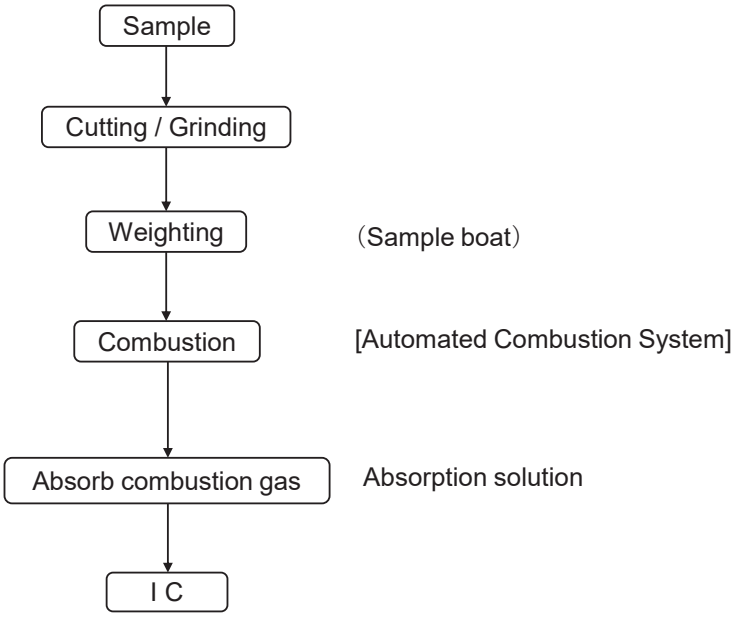
(No.230310-02160-1)
Date:April 5,2023

Test method - Flow chart

・ Chlorine(Cl),Bromine(Br)
〔Sample preparation : Combustion System〕



＜Equipment＞
・ Combustion System：AQF-2100H (Nittoseiko Analytech)
・ Ion Chromatograph：INTEGRION(thermo)

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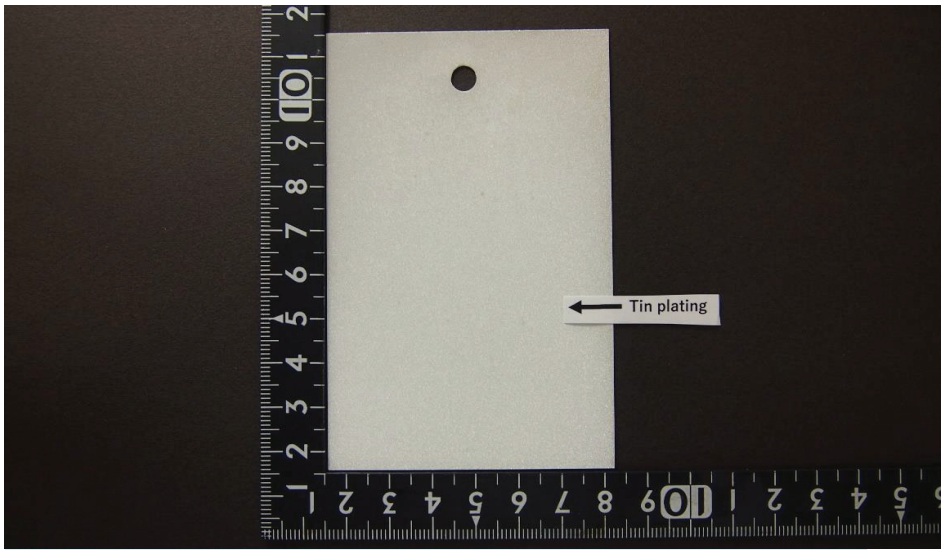

Sample name : Product J-21