

PLASTIC Reference materials

⇒ NMIJ CRMs (Manufacturer: National Metrology Institute of Japan)

● NMIJ CRM 8108-b (disk)

Polybrominated diphenyl ethers in polystyrene (30mm dia. x 2mm thick.: 5 pcs / unit)			
	CAS Number	Certified value: mass fraction (mg/kg)	Expanded uncertainty (mg/kg)
decabromodiphenyl ether	1163-19-5	312	17

● NMIJ CRM 8110-a (disk)

Polybrominated diphenyl ethers in polystyrene (30mm dia. x 2mm thick.: 5 pcs / unit)			
	CAS Number	Certified value: mass fraction (mg/kg)	Expanded uncertainty (mg/kg)
decabromodiphenyl ether	1163-19-5	886	28

● NMIJ CRM 8112-a (pellet)

Heavy metals (Cd, Cr, Hg, Pb) in ABS resin-low concentration pellet (25g)				
Elements	Cd	Cr	Hg	Pb
Certified values	9.383	94.47	94.10	94.98

mass fraction (mg/kg)

● NMIJ CRM 8115-a (disk)

Heavy metals (Cd, Cr, Hg, Pb) in ABS resin-low concentration disk (30mm dia. x 2mm thick.)				
Elements	Cd	Cr	Hg	Pb
Certified values	9.341	94.27	93.81	94.21

mass fraction (mg/kg)

● NMIJ CRM 8137-a (pellet)

PP Resin Pellet for Bromine Analysis (25g)		
	Certified value: mass fraction (mg/kg)	Expanded uncertainty (mg/kg)
Br	303	15

● NMIJ CRM 8152-b (pellets)

Polyvinyl Chloride (Phthalate Esters in PVC Resin Pellet) (20 g)			
	CAS Number	Certified value: mass fraction (mg/kg)	Expanded uncertainty (mg/kg)
Diethyl Phthalate	84-66-2	879	56
Di-n-butyl Phthalate	84-74-2	879	70
Butyl benzyl Phthalate	85-68-7	871	53
Dicyclohexyl Phthalate	84-61-7	861	58
Di-2-ethylhexyl phthalate	117-81-7	876	76

● NMIJ CRM 8155-a (plate)

Perfluoroalkyl Substances in ABS Resin (20mm x 20mm x 2mm: 3pcs / unit)			
	CAS Number	Certified value: mass fraction (mg/kg)	Expanded uncertainty (mg/kg)
Perfluorooctanesulfonic acid (Hepatadecafluoro-1- octanesulfonic acid)	1763-23-1	33.1	5.0

● NMIJ CRM 8156-a (pellet)

Polyvinyl Chloride (Phthalate Esters in PVC Resin Pellet Low Concentration) (10g)			
Substance	CAS Number	Certified value: Mass fraction (mg/kg)	Expanded uncertainty Mass fraction (mg/kg)
Diethyl phthalate	84-66-2	93	18
Dipropyl phthalate	131-16-8	90	15
Dibutyl phthalate	84-74-2	92	17
Benzyl butyl phthalate	85-68-7	90	14
Dipentyl phthalate	131-18-0	94	16
Dihexyl phthalate	84-75-3	93	17
Dicyclohexyl phthalate	84-61-7	92	15
Bis(2-ethylhexyl) phthalate	117-81-7	95	16

⇒ JSAC CRMs (Manufacturer: Japan Society for Analytical Chemistry)

● JSAC CRM 0611-2 – 0615-2 (disk)

Plastics (polyester) for Fluorescent X-ray Analysis (40mm dia. x 4.0mm thick.: 5 pcs / set)		
CRM	Elements	Certified value
JSAC 0611-2 (for blank test)	Pb	0.00 ± 0.06
	Cd	0.00 ± 0.01
	Cr	0.00 ± 0.04
JSAC 0612-2	Pb	24.2 ± 0.3
	Cd	8.6 ± 0.2
	Cr	24.3 ± 0.4
JSAC 0613-2	Pb	48.5 ± 0.7
	Cd	21.9 ± 0.6
	Cr	48.8 ± 0.5
JSAC 0614-2	Pb	95.9 ± 1.8
	Cd	43.0 ± 1.3
	Cr	96.6 ± 1.3
JSAC 0615-2	Pb	192.9 ± 3.0
	Cd	86.6 ± 2.4
	Cr	194.1 ± 2.1

mass fraction (µg/g)

● JSAC CRM 0621 – 0625 (disk)

Plastics (polyester) for Fluorescent X-ray Analysis of Trace Mercury (40mm dia. x 4.0mm thick.: 5 pcs / set)		
CRM	Elements	Certified value
JSAC 0621 (for blank test)		Reference value Less than 1
JSAC 0622	Hg	10.0 ± 0.2
JSAC 0623	Hg	49.0 ± 1.0
JSAC 0624	Hg	121.1 ± 2.2
JSAC 0625	Hg	244.4 ± 6.3

mass fraction (mg/kg)

● JSAC CRM 0641 and JSAC CRM 0642 (chips)

Plastics (PBDEs) for Chemical Analysis (each 25g)		
CRM	Elements	Certified value
JSAC 0641	Deca	27.2 ± 2.6
	Nona	21.1 ± 2.7
	Octa	46.9 ± 6.6
	Hepta	60.0 ± 4.7
	Hexa	16.4 ± 2.0
	Penta	28.2 ± 3.8
	Tetra	18.7 ± 2.5
	Br	170 ± 5
JSAC 0642	Deca	137 ± 13
	Nona	113 ± 15
	Octa	287 ± 42
	Hepta	361 ± 30
	Hexa	75 ± 13
	Br	792 ± 12

mass fraction (µg/g)

● JSAC CRM 0651 - JSAC CRM 0655 (disk)

Plastics (polyester) for Fluorescent X-ray Analysis of Bromine (40mm dia. x 4.0mm thick.: 5 pcs / set)		
CRM	Elements	Certified value
JSAC 0651 (for blank test)	Br	Reference value Less than 1
JSAC 0652	Br	105.8 ± 3.6
JSAC 0653	Br	292.6 ± 7.9
JSAC 0654	Br	595 ± 15
JSAC 0655	Br	993 ± 23

mass fraction (µg/g)

● JSAC PT0661-2, PT0661-3 (disk)

Plastics (polyester) for Chemical Analysis for Chlorine (40mm dia. x 4.0mm thick.)		
CRM	Elements	Reference value (µg/g)
JSAC PT0661-3	Cl	185

Value is not Certified value.

➤ *JFE RMs (Manufacturer: JFE Techno-research Corporation)*

● JSM P 700-1

● JSM P 701-1

Plastic (polyethylene) reference material for chemical analysis (grain: 50g)

Item No.	Cd	Pb	Hg	Cr	As	Br	Cl	S
Unit	(μ g/g)					(mass %)		
JSM P 700-1	5.0	5.0	5.3	4.9	9.1	0.002*	0.004*	0.006*
JSM P 701-1	113.5	111.3	111.6	114.8	187.3	0.05*	0.06*	0.04*

*) non-certified value

● JSM P 702-1

● JSM P 703-1

Plastic (polyethylene) reference material for chemical analysis (grain: 50g) (mass %)

Item No.	F	Na	Mg	Al	Si	P	S
JSM P 702-1	—	0.0012	0.0015	0.0012	0.0008*	0.0011	0.0014*
JSM P 703-1	0.018*	0.024	0.029	0.022	0.018	0.017	0.021*
Item No.	Ca	Ti	Zn	Fe	Cl	Cr	
JSM P 702-1	0.0013	0.0009	0.0010	0.0015	0.0017*	0.0012	
JSM P 703-1	0.023	0.017	0.020	0.021	0.018*	0.020	

*) non-certified value

● JSM P 704

Plastic (polyethylene) reference material for chemical analysis (grain: 50g) (mass %)

Item No.	Sn
JSM P 704-1	0.019
JSM P 704-2	0.057
JSM P 704-3	0.097

● JSM P 710-1

Plastic (polyethylene) reference material for X-ray fluorescence analysis (plate)

(30mm x 30mm x 3mm thick.: 7 pcs / set)

Item No.	Cd	Pb	Hg	Cr	As	Br	
Unit	$(\mu\text{g/g})$					(%)	
JSM P 710-1	a	<1	<1	<1	<1	<1	<0.001*
	b	5	5	5	5	9	0.002*
	c	50	50	51	52	86	0.035*
	d	114	111	112	115	187	0.05*
	e	264	270	254	265	478	0.15*
	f	522	532	546	515	907	0.27*
	g	1.11×10^3	1.12×10^3	1.09×10^3	1.10×10^3	1.95×10^3	0.62*

*) non-certified value

Note) Not every analyzer gets accurate result by the effect of coexistent materials.

Result accuracy (check your analyzer by the chart and the linearity of the calibration curve.)

Analysis	Cd	Pb	Hg	Cr	As	Br
Wavelength dispersive X-ray fluorescence analysis (WDX)	○	○	○	○	○	△
Energy dispersive X-ray fluorescence analysis (EDX)	○	○	○	—	—	△

● JSM P 711-1

Plastic (polyethylene) reference material for X-ray fluorescence analysis (disk)

(40mm dia. x 4mm thick.: 4 pcs / set)

(%)

Sample	JSM P711-1			
	a	b	c	d
Sb	<0.001	0.010	0.039	0.079

● JSM P 712-1

Plastic (polyethylene) reference material for X-ray fluorescence analysis (disk)

(40mm dia. x 4mm thick.: 4 pcs / set)

(%)

Sample	JSM P712-1			
	a	b	c	d
Sn	<0.001	0.019	0.060	0.101

● JSM P 713-1

Plastic (polyethylene) reference material for X-ray fluorescence analysis (disk)

(40mm dia. x 4mm thick.: 5 pcs / set)

Sample	JSM P713-1				
	a	b	c	d	e
Cl	<0.001	0.22	0.51	1.25	2.52

➤ *SPEX Phthalate standards (PVC sheet form)*

For IEC62321-8	7 Phthalates in PVC Sheet						
	30mm x 30mm x 4 sheets / pack						
							(unit: mg/kg)
Cat. No.	DEHP	BBP	DBP	DIBP	DIDP	DINP	DNOP
SVO-STC-149	0	0	0	0	0	0	0
SVO-STC-150	100	100	100	100	100	100	100
SVO-STC-151	1000	1000	1000	1000	1000	1000	1000