



# ANALYTICAL REFERENCE MATERIALS INTERNATIONAL

## *RoHS & WEEE REFERENCE MATERIALS*

**RoHS** stands for *Restriction of Hazardous Substances*, also known as Directive 2002/95/EC, which originated in the European Union and restricts the use of specific hazardous materials found in electrical and electronic products. All applicable products sold into the EU market after **July 1, 2006** must pass **RoHS** compliance. **RoHS** affects the entire electronics industry.

The substances banned under **RoHS** are lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr VI), polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE). The maximum allowed limits are ~1000 ppm, except for Cd, which is ~100 ppm.

The restricted materials are hazardous to the environment, pollute landfills, and dangerous in terms of occupational exposure during manufacturing and recycling. Any business that sells applicable electronic products, sub-assemblies, or components directly to EU countries, or sells to resellers, distributors or integrators that in turn sell products to EU countries, is impacted if the products utilize any of the restricted materials.

**WEEE** stands for *Waste from Electrical and Electronic Equipment*, also known as Directive 2002/96/EC, mandates the treatment, recovery and recycling of electric and electronic equipment (90% ends up in landfills). All applicable products sold into the EU market after **August 13, 2006** must pass **WEEE** compliance and carry the "Wheelie Bin" sticker.

**Please see the back of this page for tables containing the typical chemistries for Metal Alloys and XRF Glasses as the RoHS & WEEE Reference Materials**

### **Heavy Metals in Plastic Reference Materials for XRF Analysis**

These sets have become very popular due to the RoHS regulations coming into effect in July, 2006.

European Community (EC) directive (EU Directive 2002/95/EC "Restrictions of Hazardous Substances", RoHS) has defined specific limits for heavy metals in plastic. These sets of PE and PVC have been designed for screening heavy metals to check for compliance of these limits.

Two 3-piece sets of Reference Materials (RMs) containing Br, Hg, Cr, Pb, & Cd in PE and PVC base materials are now available. Each RM set consists of 3 individual discs of either PE or PVC; each disc is ~31 mm in diameter and ~13 mm thick. A manufacturing process has been developed that yields materials with good homogeneity.

These reference materials are on the shelf, and ready for immediate delivery!

**Please see the back of this page for tables containing typical chemistries for these RoHS Reference Materials**



Solder Alloys	Ag	Al	As	Au	Bi	Cd	Cu	Fe	Hg	In	Ni	P	Pb	S	Sb	Se	Zn
74X CA2 - % wt	3.50	0.0002	0.0100	0.0014	0.0329	0.0010	0.782	0.0021	0.0007	0.0062	0.0308	0.0055	0.0331	(0.0048)	0.0737	0.0015	0.0003
74X CA4 - % wt	2.95	0.0002	0.0171	0.0021	0.0641	(0.0001)	0.473	0.007	0.0015	0.0040	0.065	(0.0013)	0.0621	(0.0056)	0.041	0.0065	0.0008
74X CA5 - % wt	4.01	(0.0003)	0.0353	0.0049	0.0207	0.0025	1.098	0.0019	0.0006	0.0111	0.0147	0.0108	0.0116	0.0006	0.133	0.003	0.0009
74X CA6 - % wt	0.282	0.0006	0.0086	0.0106	0.0087	0.00033	0.629	0.0061	0.0064	0.0218	0.0194	0.0046	0.0174	(0.0008)	0.0078	0.0007	0.0006
74X CA7 - % wt	4.21	...	0.0095	...	0.0081	0.0045	0.333	0.0047	0.053	0.0026	0.0007	0.003	0.0965	...	0.0103	...	...
74X CA8 - %wt	2.44	...	0.0100	...	0.0032	0.0103	0.947	0.0037	0.101	0.0041	0.0007	0.0077	0.0403	...	0.0045	...	...

Copper Alloys	Ag	Al	As	Au	B	Be	Bi	Cd	Co	Cr	Fe	Mg	Mn	Ni	Pb	Sb	Se	Si	Sn	Te	Zn
39 X 17866 - ppm	61	<10	400	...	...	(1)	63	327	229	15	101	2	1.6	548	240	58	30	(7)	2100	53	340
39 X 17868 - ppm	250	1390	294	220	30	13	430	330	480	2000	470	470	580	330	380	330	40	1000	350	320	390
39 X 17869 - ppm	440	6	137	90	...	...	440	85	133	2.3	230	4	13	144	478	389	63	(7)	150	323	110
39 X 17871 - ppm	270	(2)	290	45	(2)	4	700	32	8	2	20	(2)	10	275	90	180	280	(3)	(20)	110	8
SUS - RC11 - ppm	...	4	1	...	...	...	1	1	3	...	5	...	1	5	2	1	1	1	4	1	2
SUS - RC12 - % wt	...	0.3	0.15	...	...	0	0.015	0.03	0.1	...	0.2	...	0.2	0.5	0.08	0.04	0.02	0.2	0.5	0.02	0.6

Aluminum Alloys	As	Cd	Cr	Cu	Fe	Hg	Mg	Mn	Ni	Pb	Si	Ti	V	Zn	Zr
350/02 - % wt	<0.00003	<0.00002	0.0009	0.149	0.461	<0.00005	1.08	1.16	0.003	0.00066	0.255	0.0246	0.0114	0.0522	0.005
351/02 - % wt	0.00135	0.0013	(0.001)	(0.15)	(0.46)	0.00094	(1.08)	(1.16)	(0.003)	0.0025	(0.26)	(0.025)	(0.011)	(0.052)	(0.005)
352/02 - % wt	0.00142	0.0021	(0.0007)	(0.15)	(0.48)	0.0022	(1.06)	(1.13)	(0.003)	0.0039	(0.26)	(0.019)	(0.01)	(0.049)	(0.005)
353/02 - % wt	0.0061	0.005	(0.001)	(0.15)	(0.46)	0.0059	(1.08)	(1.16)	(0.003)	0.0053	(0.26)	(0.025)	(0.011)	(0.052)	(0.005)
354/02 - % wt	0.0121	0.01	(0.001)	(0.15)	(0.46)	0.0099	(1.08)	(1.16)	(0.003)	0.0101	(0.26)	(0.025)	(0.011)	(0.052)	(0.005)

Iron Alloys	Al	As	B	C	Co	Cr	Cu	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Si	Sn	Ti	V	Zr
182A - % wt	0.020	0.008	0.0003	0.20	0.011	0.56	0.23	0.90	0.18	0.0067	0.003	0.50	0.0014	0.028	0.14	0.023	0.25	0.012	0.005	0.005	<0.003
183B - % wt	[0.003]	[0.002]	[0.002]	[0.073]	[0.005]	[0.046]	[0.021]	[1.08]	[0.006]	[0.003]	[(0.001)]	[0.024]	[0.014]	[0.060]	[0.28]	[0.33]	[0.004]	[0.002]	[0.001]	[0.003]	[0.002]

PVC Materials	Br	Hg	Cr	Pb	Cd
PVC-H-03A - ppm	1101	1101	1001	1201	300
PVC-L-04A - ppm	500	200	400	400	100
PVC-01A - ppm	0	0	0	0	0

PE Materials	Br	Hg	Cr	Pb	Cd
PE-H-04A - ppm	1100	1100	1001	1200	300
PE-L-04A - ppm	502	201	400	400	100
PE-02A - ppm	0	0	0	0	0

SAC305 & SAC405 Check Set							
	Sn	Pb	Cu	Bi	Ag	Hg	P
SAC305 - % wt	Bal.	0.076	0.49	0.004	3.00	0.0016	0.004
SAC405 - % wt	Bal.	<0.001	0.46	—	4.01	0.0002	0.006

XRF Glasses*	Br	Hg	Cr	Pb	Cd
BR-ROHS 1/3 - ppm	0	0	0	0	0
BR-ROHS 2/3 - ppm	1000	0	1000	1000	100
BR ROHS 3/3 - ppm	5000	0	5000	5000	1000

\*Matrix: SiO<sup>2</sup>=53%, Na<sup>2</sup>O=17%, CaO=10%, Al<sup>2</sup>O<sup>3</sup>=7%, MgO=6%, B<sup>2</sup>O<sup>3</sup>=4%, Sb<sup>2</sup>O<sup>3</sup>=1%

