

TECHLAB

Matériaux de Référence Certifiés & Equipements de Laboratoire

4C la Tannerie
BP 30 055
St Julien-lès-Metz
F - 57072 METZ Cedex 3

☎ : 03 87 75 54 29

☎ : 03 87 36 23 90

E-MAIL : techlab@techlab.fr

WEB : www.techlab.fr



SANTE ET HYGIENE INDUSTRIELLE
Health & Industrial hygiene
Filtres, Peinture, Amiante, Silice
Filters, Paint, Asbestos, Silica

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ASBESTOS

Asbestos in lung tissue

With Council Directive 90/394/EEC on the protection of workers from the risks related to the exposure to carcinogens at work, asbestos analyses of human lung tissue have gained an increasing importance. In particular for the assessment of past asbestos exposure in lung cancer and mesothelioma patients, reliable analytical data of asbestos determinations are mandatory. Some inevitable variations of the analytical results will be caused by surgical or autopsy specimens, which are taken from various parts of the lung. This sets a practical limit for the required precision of the measurements. BCR-665 and –666 have been designed as a tool to control and improve the quality of involved measurements, often performed by means of analytical electron microscopy.

	BCR-665 Asbestos fibres in lung tissue (Number of fibres of more than 1 µm in length in million per g dry tissue)	BCR-666 Asbestos fibres in lung tissue (Number of fibres of more than 1 µm in length in million per g dry tissue)
Amosite + crocidolite	49 ± 16	2.3 ± 0.9
Anthophyllite	1.8 ± 0.9	5.1 ± 1.5

Availability: Sealed vials with 100 mg of lung tissue.

AMIANTE ET SILICE RESPIRABLE

Reference	LGC6000		LGC6001
Material	Asbestos board - reference training mataterial		Asbestos lagging - reference training mataterial
Unit of Issue	10 g		10 g
Certified Constituent	g / 100 g		
	Board A	Board B	
Amosite	10.2 (range : 8.5-11.8)	13.8 (range :12.4-14.9)	0.7
Chrysotile			1.0
Crocidolite			0.9

These SRMs are for use in identifying and quantifying asbestos types. **SRM1866a** consists of a set of three common bulk mine-grade asbestos materials ; chrysotile, grunerite (Amosite), riebeckite (Crocidolite), and one glass fiber sample. **SRM1867** consists of a set of three uncommon mine-grade asbestos materials ; antophyllite, tremolite, and actinolite. The optical properties of SRMs 1866a and 1867 as observed by polarized light microscopy (PLM), have been characterized so that they may serve as primary calibration standards for the identification of asbestos types in building materials.

SRM1868 consists of a set of two common bulk mine-grade asbestos materials, chrysotile and grunerite (Amosite), contained in matrices simulating building materials (calcium carbonate and glass fiber), in quantities at just below the U.S EPA regulatory limit of 1 %. This SRM is certified by weight for the quantity of each asbestos material present.

SRM1876b is intended for use in evaluating the techniques used to identify and count chrysotile asbestos fibers by transmission electron microscopy (TEM). A unit consists of sections of mixed-cellulose-ester filters containing chrysotile asbestos fibers deposited by an aerosol generator.

SRM8411 consists of a section of collapsed mixed-cellulose-ester filters with a high concentration (138 fibers / 0.01 mm²) of chrysotile asbestos and a medium concentration (43 fibers / 0.01 mm²) of grunerite (Amosite) asbestos. It is intended for use in evaluating the techniques used to identify and count asbestos fibers by transmission electron microscopy (TEM).

Reference	Description	Unit size
SRM1866a	Common commercial asbestos	set of 3 : 4 g each
SRM1867	Uncommon commercial asbestos	set of 3 : 5 to 10 g each
SRM1868	Quantitative asbestos in building materials	set of 2 : 5 to 10 g each
SRM1876b	Chrysotile asbestos for TEM	set of 10 : 3 mm x 3 mm
SRM8411	Mixed asbestos research filter	1 cm ²

RESPIRABLE SILICA (Powder form)

Some workers are potentially exposed to crystalline silica, which causes the lung disease silicosis. **SRMs 1878a, 1879 and 1879a** are crystalline silica materials with particles in the respirable range. They are intended for use in determining by X-ray diffraction, the levels of respirable silica in an industrial atmosphere according to NIOSH Analytical Method P & CAM 259 or equivalent methods.

Note : these SRMs are not certified for particle size.

Reference	Description	Unit size	Component (in Wt.%)
SRM1878a	Respirable Alpha Quartz	5 g	Crystalline α quartz 100.00 %
SRM1879a	Respirable Cristobalite	5 g	Crystalline cristobalite 95.6 %

PAINT

Reference	LGC3005	LGC3006	LGC3007	LGC3008
Material	Alkyd resin paint panel - type 1	Alkyd resin paint panel - type 2	Nitrocellulose paint panel - type 1	Nitrocellulose paint panel - type 2
Unit of issue	4 x (15 x 10 cm)			
Certified constituent	mg / kg			
Antimony		46.8		33.5
Arsenic		56.7		39.1
Barium	656		470	
Cadmium	179		256	
Chromium	39.7		32.1	
Lead	132		49.9	
Mercury		(253)		(70.8)
Selenium		353		357

Reference	LGC3009	LGC3010	LGC3011	LGC3012
Material	Alkyd resin paint flake - type 1	Alkyd resin paint flake - type 2	Nitrocellulose paint flake - type 1	Nitrocellulose paint flake - type 2
Unit of issue	4 x 2 g			
Certified constituent	mg / kg			
Antimony		3.85		7.68
Arsenic		22.5		16.7
Barium	187		350	
Cadmium	2.68		116	
Chromium	2.00		6.24	
Lead	6.30		15.6	
Mercury		(87.8)		(103)
Selenium		26.3		116

LEAD IN PAINT, DUST, & SOIL (Powder and sheet forms)

These SRMs and RM have been developed in conjunction with the U.S. EPA to monitor paint, soil, and dust sources of lead. **SRMs 2570** through **2576** consist of one Mylar™ sheet per unit. Each sheet, 7.6 cm x 10.2 cm, is coated with a single uniform paint layer for use with portable x-ray fluorescence analyzers. **SRM2579a** consists of a set of six Mylar™ sheets, one each of **SRMs 2570** through **2575**. **SRMs 2580, 2581, 2582, and 2589** consist of paint that has been ground and homogenized into a powder, 99+% of which passes a 100 µm sieve. **SRM2583 and SRM2584** consist of dust, 99+% of which passes a 100 µm sieve, that was collected in vacuum cleaner bags during cleaning of dwelling interiors. **SRM2583 and SRM2584** are certified for arsenic, chromium, cadmium, lead, and mercury. [Also see category 106]. **SRMs 2584, 2586, and 2587** are dust or soil matrices containing lead from paint. **RM8680** consists of a 10.2 cm wide x 15.2 cm long x 1.3 cm thick section of painted fiberboard and is intended for use in the evaluation of destructive and nondestructive methods of measuring lead in paint on fiberboard.

Reference	Description	Unit size	Lead concentration
SRM1579a	Powdered lead base paint	35 g	11.995 Wt. %
SRM2570	Lead paint film, blank	1 blank film	< 0.001 mg / cm ²
SRM2571	Lead paint film, nominal 3.5 mg / cm ²	1 film, plus blank	3.58 mg / cm ²
SRM2572	Lead paint film, nominal 1.6 mg / cm ²	1 film, plus blank	1.527 mg / cm ²
SRM2573	Lead paint film, nominal 1.0 mg / cm ²	1 film, plus blank	1.040 mg / cm ²
SRM2574	Lead paint film, nominal 0.7 mg / cm ²	1 film, plus blank	0.714 mg / cm ²
SRM2575	Lead paint film, nominal 0.3 mg / cm ²	1 film, plus blank	0.307 mg / cm ²
SRM2576	Lead paint film, high level	1 film, plus blank	5.59 mg / cm ²

Reference	Description	Unit size	Lead concentration
SRM2579a	Lead paint films for portable x-ray Fluorescence analysers (SRMs 2570-2575)	5 films, plus blank	0.307 to 3.58 mg / cm ²
SRM2580	Powdered paint, nominal 4 % lead	30 g	4.34 %
SRM2581	Powdered paint, nominal 0.5 % lead	35 g	0.449 %
SRM2582	Powdered paint, nominal 200 mg / kg lead	20 g	209.8 mg / kg
SRM2583	Trace elements in indoor dust, 5 cert. Values (As, Cd, Cr, Hg, Pb)	8 g	85.9 mg / kg
SRM2584	Trace elements in indoor dust, 5 cert. Values (As, Cd, Cr, Hg, Pb), 10 ref values 22 information values	8 g	9761 mg / kg
SRM2586	Trace element in soil containing lead from paint, nominal 500 mg / kg lead	50 g	432 mg / kg
SRM2587	Trace element in soil containing lead from paint, nominal 3000 mg / kg lead	50 g	3242 mg / kg
SRM2589	Powdered paint, nominal 10 % lead	35 g	9.99 %
RM8680	Paint on fiberboard, nominal 1 to 2 mg / cm ²	1 sheet	Individually value assigned

Reference	Description	Unit size	Lead concentration
SRM1648	Poussière particulaire urbaine Voir catalogue E4 poussières	2 g	0.655%
SRM1649A	Poussière urbaine Voir catalogue F1 composés organiques	2.5 g	
SRM2709	Sol Voir catalogue E2	50 g	18.9 mg/kg
SRM2710	Sol Voir catalogue E2	50 g	18.9 mg/kg
SRM2711	Sol Voir catalogue E2	50 g	18.9 mg/kg
SRM2783	Air sur filtre Voir catalogue E4 poussières	2 +2 blancs	317 ng

FILTER MEDIA

MATERIALS ON FILTER MEDIA

These SRMs consists of potentially hazardous materials deposited on filters to be used to determine the levels of these materials in industrial atmospheres. **SRMs 2672d, 2677a, 2679a** provide element values at four different levels ;**SRM3087** provides element values at one level only.

Reference	Description	Unit size	Element / Component (in µg / filter)				
			I	II	III	IV	
SRM2676d	Metals on filter media	set of 6	Cadmium	0.97	2.81	10.04	(<0.0005)
			Lead	7.44	14.82	29.77	(<0.0005)
			Manganese	2.09	9.83	19.83	(<0.0005)
			Zinc	10.17	49.47	99.31	(0.26)
SRM2677a	Beryllium and arsenic on filter media	2 sets of 5	Beryllium	0.129	0.643	2.58	0.050 ≤ 0.0005 blank
			Arsenic	0.269	2.69	26.92	0.101 ≤ 0.0005 blank
SRM2679a	Quartz on filter media	set of 4	Quartz	≤ 2	30.8	80.2	202.7
			Clay	(370)	(370)	(370)	(370)
SRM3087a	Metals on filter media	set of 6 and 6 blanks	Arsenic	50.48			
			Barium	25.24			
			Cadmium	15.14			
			Chromium	10.10			
			Iron	25.24			
			Magnesium	25.24			
			Manganese	10.10			
			Nickel	25.24			
			Lead	40.38			
			Selenium	25.24			
			Vanadium	50.48			
			Zinc	100.94			

Values in parentheses are not certified and are given for information only.

TRACE CONSTITUENT ELEMENTS IN BLANK FILTERS

SRMs 2678 and 2681 are for use in evaluating the performance of air sampling methods with two different filter types or sizes commonly used in air sampling of industrial atmospheres. For both SRMs, either certified values (in µg), or limits of detection (XD), for each of 30 constituent elements as well as 6 leachable anions and cations are provided.

Reference	Description	Diameter (in mm)	Pore size (in µm)	Filter weight (in g)
SRM2678	Cellulose acetate membrane	47	0.45	0.09
SRM2681	Ashless	42.5		0.14

CHROMIUM SPECIES

Cr VI and total leachable Cr

Reference	CRM545 Welding dust loaded on a filter (g / kg)
Cr (VI)	40.2 ± 0.6
Total leachable Cr	39.5 ± 1.3

Availability : glass fibre filter loaded with welding dust containing about 100 µg Cr (VI)

See also CRM544 Cr (III), Cr (VI) and total Cr in a lyophilised solution described in the environnement section.

Reference	NOA-2	NOB-2
Description	Cellulose acetate filter	Cellulose acetate filter
Unit of issue	5 filters (each 37 mm)	5 filters (each 37 mm)
Certified constituent	μg	
Aluminium	255	125
Arsenic	8.68	4.25
Boron	(40)	(20)
Barium	(40)	(20)
Beryllium	1.68	0.82
Cadmium	16.9	8.29
Cobalt	42.3	20.7
Chromium	54.3	26.6
Copper	85.2	41.7
Iron	593	290
Mercury	9.44	4.62
Magnesium	84.6	41.4
Manganese	170	83.1
Molybdenum	42.7	20.9
Nickel	68.4	33.5
Lead	42.0	20.5
Antimony	42.6	20.8
Tin	42.8	21.0
Titanium	42.0	20.5
Thallium	2.96	1.45
Vanadium	17.6	8.60
Tungsten	43.4	21.2
Zinc	256	125
Zirconium	(40)	(21)

Values in parentheses are not certified and are given for information only.

GLASS FIBRE FILTERS

Reference	CRM553 spiked mass per filter (expressed as μg formaldehyde)	CRM554 mass per filter (blank) (expressed as μg formaldehyde)
Formaldehyde-2,4- dinitrophenylhydrazone on glass fibre filters	4.96 \pm 0.05	<0.1

Availability: set of 2 samples of CRM553 and 1 sample of CRM554.

ALDEHYDES AS 2,4-DINITROPHENYL HYDRAZONES

Pure Compounds

Reference	Description	Purity
CRM546	Formaldehyde 2,4-dinitrophenylhydrazone	> 0.993
CRM547	Acetaldehyde 2,4- dinitrophenylhydrazone	0.983 \pm 0.005
CRM548	Acrolein 2,4- dinitrophenylhydrazone	> 0.979
CRM549	Acetone 2,4- dinitrophenylhydrazone	> 0.996
CRM550	Glutaraldehyde 2,4- dinitrophenylhydrazone	> 0.981

Availability: approximately 10 mg of crystals in glass vials.

Calibration solutions in acetonitrile

Compounds	CRM551 Mass concentration ($\mu\text{g} / \text{ml}$)	CRM552 Mass concentration ($\mu\text{g} / \text{ml}$)
Formaldehyde 2,4- dinitrophenylhydrazone	2.94 ± 0.05	$< 0.08 \mu\text{g} / \text{ml}$
Acetaldehyde 2,4- dinitrophenylhydrazone	4.89 ± 0.07	$< 0.05 \mu\text{g} / \text{ml}$
Acrolein 2,4- dinitrophenylhydrazone	0.483 ± 0.011	$< 0.04 \mu\text{g} / \text{ml}$
Acetone 2,4- dinitrophenylhydrazone	4.96 ± 0.07	$< 0.05 \mu\text{g} / \text{ml}$

Availability : sets of 4 samples of CRM551 and 1 sample of CRM552.

BTX-AROMATIC COMPOUNDS

Compounds	CRM112 mass of sorbed aromatic hydrocarbon on tenax per charged tube (μg)	CRM562 mass of sorbed aromatic hydrocarbon on charcoal per charged tube (μg)
Benzene	1.053 ± 0.014	15.0 ± 0.4
Toluene	1.125 ± 0.015	147.3 ± 3.8
m-Xylene	1.043 ± 0.015	96.4 ± 2.5
o-Xylene		93.0 ± 2.9

Availability : **CRM112** : Consists of one stainless steel sampling tube (89 mm length ; 6.34 mm outer diameter, closed with Swagelock caps with Teflon ferrules) containing 100 mg of charged Tenax.

CRM562 : One set contains 20 glass tubes containing a single section of charcoal. Of these, six are charged with the four aromatic hydrocarbons at the levels shown above. Two have been opened and sealed in the same manner as the charged tubes, but have not been charged ; these are intended as a means to check that no contamination occurred after sealing. The other 12 tubes are unopened as received from the manufacturer, and are intended for determining the desorption efficiency of the charcoal.

Chlorinated hydrocarbons on Tenax

Substance	BCR-555 (ng)
Dichloromethane	315 ± 20
1,1,1-Trichloroethane	366 ± 21
Trichloroethylene	388 ± 14
Perchloroethylene	327 ± 11
Toluene	56.4 ± 1.4

Availability: Stainless steel tube of 9.0 cm length and 0.25 inches outer diameter containing a single section of 250 mg TENAX GR, charged with 4 chlorinated hydrocarbons and toluene at the levels shown above.