113.1 - Cements and Related materials (powder form)

These portland (1880b, 1881b, 1884b, 1885b, 1886a, 1886b, 1887a, 1888b, and 1889b) and calcium aluminate (1882a and 1883a) cement SRMs are intended for x-ray spectroscopic and chemical analysis of cements and related materials. SRM 2696 Silica Fume is a cement additive. Each unit of SRM 2696 consists of one bottle.

SRM 1886b has been introduced to provide values for Loss on Ignition at intermediate temperatures that are not provided by SRM 1886a. Please refer to the explanation in the appendix to the certificate of analysis for SRM 1886b or any of the other cement SRMs in the 1880b and 633a series. SRM 1886a remains valid until its expiration date, at which time it will be evaluated for stability and continued utility to the cement industry. SRM 1886a and SRM 1886b are unique materials developed in separate projects. Both may be used for validation of test method results and for evaluation of calibration processes for testing of produced cement. For technical information, please contact Bruce Scruggs at bruce.scruggs@nist.gov. For sales information, please contact srminfo@nist.gov.

PLEASE NOTE: The tables are presented to facilitate comparisons among a family of materials to help customers select the best SRM for their needs. For specific values and uncertainties, the certificate is the only official source.

Description >>	633a Portland Cement	634a Portland Cement	635a Portland Cement (Blended with Slag)	1880b Portland Cement	1881b Portland Cement (Blended with Fly Ash)	1882a Calcium Aluminate Cement	1883a Calcium Aluminate Cement	1884b Portland Cement	1885b Portland Cement	1886a Portland Cement (White Portland Cement with Low Iron)	1886b White Portland Cement	1887b Portland Cement	1888b Portland Cement	1889b Portland Cement (Blended with Limestone)	2429 Flue Gas Desulfurization Gypsum	2696 Silica Fume (powder form)
Unit Size >>	**4 vials x 5 g**	**100 g**	**5 vials x 5 g**	**5 vials x 5 g**	**5 vials x 5 g**	**4 vials x 5 g**	**4 vials x 5 g**	**5 vials x 4.5 g**	**5 vials x 5 g**	**4 vials x 5 g**	**5 vials x 5 g**	**5 vials x 4 g**	**4 vials x 5 g**	**5 vials x 5 g**	**1 bottle x 200 g**	**70 g**
Component (mass fraction, in %; unless otherwise noted with *µg/g or **ng/g)																
Aluminum oxide	2.911	5.015	7.867	5.183	8.812	39.14	70.04	4.851	4.70	3.875	3.903	4.911	4.277	5.79	*0.221*	0.2080
Barium Oxide	*0.256*		0.0315		0.191				0.0149		*0.009*	*0.022*		(0.02)		
Calcium oxide	64.129	65.07	54.85	64.16	49.27	39.29	29.52	61.31	61.87	67.87	66.05	61.15	63.13	60.11	*31.93*	0.426
Chlorine	0.0087		0.0146	0.01830	0.0081			*0.0065*	*0.0021*	*0.0042*	0.00399	0.01001	0.0143	0.0101		
Chromium oxide	*0.0124*	*0.0114*	0.01012	0.01927	0.00949	*0.113*	*0.006*	0.00791	0.02709	0.0024	0.00404	0.01551	*0.01253*	0.0083		
Fluoride	*0.038*			*0.0539*	(0.09)			*0.0394*	*0.0524*		*0.0118*	*0.101*	*0.048*	*0.10*		
Fluorine			*0.0553*													
Free CaO	*1.60*	(1.86)	*0.527*	*1.567*	*1.16*			*0.418*	*0.27*	(2.16)	*0.24*	*0.21*	*1.42*	*0.52*		
Insoluble Residue	*0.23*	(0.21)	*0.559*	*0.487*	*16.4*			*0.159*	*0.36*	(0.23)	*0.13*	*0.26*	*0.32*	*0.30*		
Iron oxide	3.738	3.362	3.175	3.681	3.365	14.67	0.078	2.937	3.044	0.152	0.297	2.471	3.062	2.891	*0.2357*	*0.055*
LOI 220 °C to 550 °C	*0.381*	*0.749*	*0.35*		*0.196*			*0.261*	*0.247*		*0.293*	*0.381*	*0.616*	*0.33*	(0.25)	
LOI 45 °C to 220 °C	*0.264*	*0.580*	*0.857*		*0.589*			*0.590*	*0.821*		*0.877*	*0.832*	*0.573*	*1.20*	(20.4)	
LOI 550 °C to 950 °C	*1.805*	*0.340*	*1.20*		*0.930*			*0.597*	*1.237*		*2.174*	*0.89*	*0.850*	*1.55*	(0.19)	
LOI at 950 °C	*2.460*	*1.683*	*2.45*	*1.666*	*1.699*	(0.49)	(0.35)	(1.448)	*2.310*	(1.56)		*2.121*	(2.039)	*3.117*		*2.11****
LOI between ambient and 45 ºC														(< 0.05)		
Magnesium oxide	1.1532	1.0057	3.817	1.176	2.741	0.51	0.19	4.74	3.86	1.932	1.526	3.624	3.562	2.82	*0.0431*	0.235
Manganese trioxide	0.1176	*0.0229*	0.1279	0.1981	0.1175	*0.060*	(0.003)	0.0750	0.1282	0.0073	0.02639	0.0957	0.0652	0.0840		0.0299
Mercury	24.70**				(58)**									(5**)	0.778*	
Phosphorus pentoxide	0.14263	0.1767	0.0949	0.2443	0.0510	*0.070*	(0.003)	0.0965	0.0737	0.022	0.0413	0.1540	0.07307	0.297		*0.0863*
Potassium oxide	0.391	0.3572	0.725	0.646	0.721	0.051	0.014	0.957	0.497	0.093	0.0164	0.961	0.658	1.115	*0.04587*	0.655
Silicon dioxide	22.38	20.493	23.13	20.42	29.045	4.01	0.24	19.30	20.05	22.38	22.08	19.59	20.42	18.39	*0.810*	95.61
Sodium oxide	0.203	*0.0842*	0.2477	0.0914	0.790	0.021	0.30	0.278	0.293	0.021	0.01682	0.288	0.1364	0.365		*0.129*
Strontium oxide	0.0507	*0.0735*	0.1754	*0.0272*	0.0836	*0.024*	*0.019*	0.0258	0.0795	*0.018*	0.0886	0.2625	0.1009	0.284		
Sulfide Sulfur	*0.049*		*0.242*	*0.0131*	(0.008)			*0.0072*	*0.042*		*0.089*	*0.025*	*0.015*	*0.061*		
Sulfur trioxide	2.178	2.780	3.222	2.710	2.72			4.034	2.832	2.086	2.757	4.599	2.634	*43.42*		
Titanium dioxide	0.2157	0.2463	0.353	0.236	0.3011	1.786	*0.020*	0.2651	0.2361	0.084	0.2054	0.2034	0.2316	0.260	*0.020*	
total analyzed constituents	(100.41)		(100.34)	(100.49)	(100.09)	(100.2)	(100.78)	(100.54)	(100.02)	(100.12)	(100.24)	(100.51)	(100.42)	(100.07)		
Zinc oxide	0.123	*0.0222*	0.02619	*0.01054*		*0.004*		*0.0042*	0.0354	(0.001)	*0.00058*	0.01560	*0.01253*	0.0770		0.051

- Certified values are normal font.
- Non-certified and reference values are italicized.
- Values of potential interest and information values are within parentheses.

***Loss on Ignition at 750ºC