The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２２１　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		83.85	10.032	1.572	0.044	0.151	2.786	0.686	0.461	0.270	0.014	0.022	0.012
Laboratories	L_1	83.94	10.025	1.579	0.044	0.152	2.776	0.694	0.475	0.268	0.016	0.022	0.012
	L_2	83.87	10.066	1.552	0.047	0.149	2.776	0.693	0.450	0.272	0.014	0.022	0.014
	L_3	83.62	10.058	1.574	0.046	0.149	2.766	0.673	0.484	0.268	0.014	—	0.012
	L_4	83.84	10.026	1.555	0.044	0.149	2.785	0.670	0.478	0.266	0.015	0.022	0.012
	L_5	83.98	10.013	1.561	0.048	0.152	2.792	0.692	0.468	0.270	0.014	0.021	0.014
	L_6	83.91	10.025	1.576	0.045	0.152	2.764	0.692	0.466	0.266	0.015	0.024	0.012
	L_7	83.70	9.994	1.586	0.044	0.158	2.787	0.695	0.470	0.280	0.016	0.022	0.012
	L_8	83.86	10.135	1.585	0.046	0.154	—	0.690	0.454	0.268	0.016	0.023	0.012
	L_9	83.77	9.987	1.544	0.044	0.148	2.756	0.676	0.474	0.272	0.014	0.022	0.012
	L_{10}	84.00	10.049	1.600	0.045	0.152	2.828	0.708	0.450	0.270	0.010	0.022	0.012
	L_{11}	83.88	10.045	1.574	0.044	0.148	2.813	0.678	0.436	0.269	0.013	0.020	0.012
	L_{12}	83.74	9.994	1.572	0.044	0.153	2.792	0.705	0.451	0.268	0.012	0.022	0.010
	L_{13}	83.75	10.012	1.578	0.043	0.152	2.778	0.682	0.444	0.264	0.011	0.026	0.010
	L_{14}	84.14	10.036	1.552	0.042	0.146	2.797	0.675	0.458	0.268	0.012	0.022	0.008
	L_{15}	83.82	10.032	1.569	0.042	0.147	2.755	0.677	0.440	0.258	0.012	0.022	0.011
	L_{16}	83.82	10.025	1.568	0.042	0.152	2.806	0.682	0.467	0.274	0.014	0.024	0.012
	L_{17}	83.76	10.014	1.600	0.045	0.152	2.811	0.678	0.476	0.282	0.013	0.022	0.012
Average	$(\overline{\overline{X}})$	83.847	10.0315	1.5721	0.0445	0.1509	2.7864	0.6859	0.4612	0.2696	0.0136	0.0224	0.0117
Reproducibility	$S_{\bar{x}}$	0.125	0.0345	0.0159	0.0017	0.0030	0.0212	0.0112	0.0145	0.0056	0.0018	0.0014	0.0014
(within laboratory) *1	$S_{I(T)}$	0.094	0.0418	0.0129	0.0007	0.0015	0.0255	0.0054	0.0046	0.0028	0.0011	0.0009	0.0007
Uncertainty *2	U_{CRM}	0.06	0.018	0.008	0.001	0.002	0.011	0.006	0.007	0.003	0.001	0.001	0.001

(Note) * 1 $S_{I(T)}$ is intermediate precision without a time condition.　　* 2 Uncertainty U_{CRM} =　　(ℓ = number of laboratories)

(1) List of laboratories : Krosaki Harima Corporation, Shinagawa Refractories Co, Ltd, TYK Corporation, AGC Ceramics Co, Ltd, Okayama Ceramics Research Foundation, TOSHIBA NANOANALYSIS CORPORATION, JFE Techno-Research Corporation, Sumika Chemical Analysis Service, Ltd., Hitachi Power Solutions Co, Ltd, Taiko Refractories Co., Ltd, Nihon Tokushu Rozai Co., Ltd, Rigaku Corporation

(2) Analytical techniques :JIS R 2212-2 (Method for chemical analysis of refractory products－Part 2:Silica refractories) (L_1-L_9) and ISO 12677 (Chemical analysis of refractory products by X-ray fluorescence (XRF)－Fused cast-bead method) (L_{10}-L_{17})

(3) Analytical values : Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values.

(4) Outlier tests were carried out by Grubbs test. The samples rejected by Grubbs tests were discussed in view of analytical techniques and it was determined whether the outliers should be adopted or not.

(5) Date of preparation : March, 2011

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

J R R M　2 2 2　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		84.81	7.661	3.869	0.788	0.056	0.169	0.940	0.205	0.787	0.006	0.006	0.488
Laboratories	L_1	85.06	7.501	3.920	0.798	0.060	0.178	0.916	0.219	0.778	0.006	0.008	0.494
	L_2	84.78	7.659	3.820	0.788	0.056	0.168	0.958	0.207	0.808	0.009	0.007	0.508
	L_3	84.74	7.722	3.894	0.790	0.058	0.174	0.926	0.214	0.762	0.006	0.006	0.485
	L_4	84.66	7.760	3.848	0.778	0.053	0.167	0.944	0.216	0.770	0.007	0.005	0.496
	L_5	85.10	7.648	3.876	0.791	0.056	0.168	0.944	0.214	0.802	0.010	0.008	0.499
	L_6	84.66	7.556	3.903	0.812	0.054	0.166	0.966	0.214	0.806	0.008	0.006	0.493
	L_7	84.66	7.712	3.903	0.780	0.058	0.170	0.932	0.203	0.786	0.009	0.006	0.552
	L_8	84.69	7.706	3.948	0.781	0.058	0.188	0.942	0.204	0.754	0.006	0.006	0.478
	L_9	84.91	7.666	3.876	0.776	0.056	0.174	0.960	0.191	0.790	0.004	0.006	0.478
	L_{10}	84.90	7.664	3.887	0.799	0.056	0.166	0.946	0.189	0.786	0.006	0.005	0.480
	L_{11}	84.69	7.644	3.838	0.776	0.057	0.167	0.958	0.193	0.790	0.004	0.007	0.476
	L_{12}	84.64	7.662	3.828	0.812	0.056	0.164	0.931	0.198	0.778	0.004	0.006	0.471
	L_{13}	84.94	7.658	3.786	0.785	0.054	0.164	0.926	0.208	0.784	0.006	0.006	0.470
	L_{14}	84.89	7.671	3.866	0.768	0.054	0.162	0.933	0.192	0.768	0.004	0.005	0.466
	L_{15}	84.79	7.668	3.803	0.789	0.056	0.166	0.940	0.209	0.796	0.006	0.008	0.484
	L_{16}	84.79	7.672	3.906	0.788	0.057	0.168	0.924	0.209	0.828	0.006	0.006	0.478
Average	$(\bar{\bar{x}})$	84.806	7.6606	3.8689	0.7882	0.0562	0.1694	0.9404	0.2050	0.7866	0.0063	0.0063	0.4880
Reproducibility	$s_{\bar{x}}$	0.146	0.0609	0.0450	0.0124	0.0018	0.0065	0.0146	0.0097	0.0189	0.0019	0.0010	0.0206
(within laboratory)*1	$s_{I(T)}$	0.099	0.0223	0.0166	0.0036	0.0005	0.0022	0.0054	0.0029	0.0057	0.0010	0.0005	0.0061
Uncertainty*2	U_{CRM}	0.08	0.032	0.024	0.007	0.001	0.003	0.008	0.005	0.010	0.001	0.001	0.011

(Note) * 1 $s_{I(T)}$ is intermediate precision without a time condition.　　* 2 Uncertainty $U_{CRM} = t_{e-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

(1) List of laboratories : Krosaki Harima Corporation, Shinagawa Refractories Co, Ltd, TYK Corporation, AGC Ceramics Co, Ltd, Okayama Ceramics Research Foundation, TOSHIBA NANOANALYSIS CORPORATION, JFE Techno-Research Corporation, Sumika Chemical Analysis Service, Ltd., Hitachi Power Solutions Co, Ltd, Taiko Refractories Co., Ltd, Nihon Tokushu Rozai Co., Ltd, Rigaku Corporation

(2) Analytical techniques :JIS R 2212-2 (Method for chemical analysis of refractory products－Part 2:Silica refractories) (L_1-L_8) and ISO 12677 (Chemical analysis of refractory products by X-ray fluorescence (XRF)－Fused cast-bead method) (L_9-L_{16})

(3) Analytical values : Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values from the February 22, 2008 v20080222 version on.

(4) Outlier tests were carried out by Grubbs test. The samples rejected by Grubbs tests were discussed in view of analytical techniques and it was determined whether the outliers should be adopted or not.

(5) Date of preparation : March, 2015

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２２３　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		86.08	5.227	2.042	0.049	0.203	4.147	0.271	0.693	0.372	0.014	0.036	0.676
Laboratories	L_1	86.36	5.210	2.067	0.050	0.210	4.224	0.266	0.705	0.378	0.014	0.039	0.686
	L_2	86.00	5.264	2.022	0.048	0.202	4.100	0.267	0.706	0.378	0.016	0.037	0.696
	L_3	86.00	5.292	2.060	0.048	0.198	4.176	0.269	0.702	0.362	0.016	0.036	0.692
	L_4	86.24	5.254	2.018	0.048	0.206	4.204	0.268	0.700	0.372	0.014	0.037	0.705
	L_5	86.26	5.196	2.037	0.050	0.204	4.117	0.274	0.707	0.372	0.015	0.039	0.694
	L_6	85.88	5.215	2.074	0.052	0.201	4.185	0.270	0.698	0.386	0.015	0.036	0.703
	L_7	85.78	5.258	2.084	0.049	0.202	4.230	0.268	0.688	0.365	0.016	0.036	0.674
	L_8	85.78	5.210	2.062	0.049	0.210	4.137	0.290	0.668	0.354	0.014	0.036	0.662
	L_9	86.12	5.211	2.041	0.048	0.204	4.160	0.268	0.694	0.374	0.012	0.036	0.670
	L_{10}	86.34	5.252	2.034	0.048	0.200	4.142	0.274	0.672	0.373	0.014	0.034	0.670
	L_{11}	85.94	5.216	2.020	0.048	0.206	4.102	0.280	0.693	0.373	0.012	0.036	0.672
	L_{12}	85.86	5.205	2.024	0.051	0.205	4.092	0.263	0.673	0.369	0.012	0.035	0.657
	L_{13}	86.40	5.232	2.008	0.050	0.196	4.122	0.270	0.699	0.370	0.014	0.036	0.660
	L_{14}	86.08	5.196	2.045	0.046	0.198	4.087	0.272	0.673	0.363	0.013	0.034	0.648
	L_{15}	86.01	5.210	2.013	0.047	0.204	4.132	0.264	0.702	0.378	0.014	0.038	0.674
	L_{16}	86.20	5.206	2.061	0.050	0.204	4.136	0.272	0.704	0.392	0.014	0.036	0.660
Average	$(\bar{\bar{X}})$	86.079	5.2267	2.0419	0.0489	0.2031	4.1466	0.2709	0.6928	0.3724	0.0141	0.0363	0.6764
Reproducibility	$S_{\bar{x}}$	0.202	0.0285	0.0236	0.0015	0.0040	0.0457	0.0066	0.0136	0.0092	0.0013	0.0014	0.0175
(within laboratory)*1	$S_{I(T)}$	0.148	0.0173	0.0072	0.0010	0.0023	0.0292	0.0040	0.0056	0.0038	0.0010	0.0011	0.0046
Uncertainty*2	U_{CRM}	0.11	0.015	0.013	0.001	0.002	0.024	0.004	0.007	0.005	0.001	0.001	0.009

(Note) ＊1 $S_{I(T)}$ is intermediate precision without a time condition. ＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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(3) Analytical values : Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values from the February 22, 2008 v20080222 version on.

(4) Outlier tests were carried out by Grubbs test. The samples rejected by Grubbs tests were discussed in view of analytical techniques and it was determined whether the outliers should be adopted or not.

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ＪＲＲＭ　２２４　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		87.90	4.661	2.473	0.153	0.164	1.959	0.292	0.288	0.903	0.688	0.309	0.003
Laboratories	L_1	87.96	4.670	2.512	0.154	0.172	1.992	0.284	0.305	0.902	0.692	0.318	0.000
	L_2	87.90	4.686	2.440	0.151	0.164	1.958	0.293	0.292	0.918	0.684	0.302	—
	L_3	87.85	4.727	2.516	0.154	0.162	1.987	0.297	0.298	0.882	0.680	0.316	0.002
	L_4	88.06	4.738	2.466	0.148	0.166	1.991	0.294	0.298	0.856	0.687	0.312	0.002
	L_5	88.08	4.676	2.492	0.156	0.168	1.942	0.295	0.300	0.926	0.692	0.319	0.002
	L_6	87.84	4.595	2.473	0.158	0.162	1.954	0.294	0.296	0.929	0.698	0.304	0.002
	L_7	87.76	4.575	2.474	0.152	0.161	2.005	0.288	0.281	0.905	0.698	0.301	0.002
	L_8	87.80	4.638	2.516	0.154	0.170	1.953	0.285	0.276	0.866	0.691	0.324	0.002
	L_9	87.84	4.654	2.468	0.150	0.165	1.967	0.290	0.274	0.908	0.687	0.305	0.004
	L_{10}	88.16	4.670	2.478	0.156	0.164	1.954	0.296	0.268	0.900	0.695	0.304	0.003
	L_{11}	87.88	4.654	2.452	0.152	0.168	1.938	0.302	0.280	0.909	0.694	0.310	0.002
	L_{12}	87.76	4.650	2.448	0.158	0.167	1.932	0.288	0.280	0.900	0.682	0.306	0.004
	L_{13}	87.94	4.656	2.417	0.153	0.159	1.946	0.294	0.287	0.902	0.684	0.308	0.002
	L_{14}	87.80	4.654	2.476	0.152	0.161	1.928	0.292	0.278	0.885	0.664	0.297	0.004
	L_{15}	87.92	4.657	2.438	0.151	0.166	1.954	0.292	0.294	0.918	0.696	0.309	0.004
	L_{16}	87.82	4.678	2.500	0.156	0.156	1.949	0.288	0.302	0.948	0.686	0.306	0.003
Average	$(\bar{\bar{x}})$	87.898	4.6611	2.4729	0.1534	0.1644	1.9594	0.2920	0.2881	0.9034	0.6881	0.3088	0.0025
Reproducibility	$s_{\bar{x}}$	0.117	0.0401	0.0294	0.0029	0.0042	0.0229	0.0047	0.0114	0.0232	0.0086	0.0073	0.0011
(within laboratory) *1	$s_{I(T)}$	0.102	0.0163	0.0097	0.0019	0.0012	0.0121	0.0025	0.0050	0.0060	0.0047	0.0015	0.0008
Uncertainty *2	U_{CRM}	0.06	0.021	0.016	0.002	0.002	0.012	0.002	0.006	0.012	0.005	0.004	0.001

(Note) ＊1 $s_{I(T)}$ is intermediate precision without a time condition.　＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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ＪＲＲＭ　２２５　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		89.98	3.228	1.274	0.425	0.071	3.191	0.136	0.901	0.631	0.012	0.014	0.011
Laboratories	L_1	90.00	3.188	1.272	0.418	0.071	3.178	0.138	0.919	0.634	0.013	0.014	0.012
	L_2	90.08	3.242	1.260	0.428	0.070	3.191	0.134	0.890	0.622	0.014	0.016	0.012
	L_3	89.60	3.308	1.282	0.448	0.072	3.186	0.133	0.910	0.638	0.010	—	0.010
	L_4	90.06	3.354	1.268	0.414	0.070	3.203	0.137	0.917	0.624	0.008	0.012	0.012
	L_5	90.00	3.214	1.264	0.435	0.072	3.203	0.136	0.922	0.642	0.012	0.013	0.011
	L_6	90.06	3.213	1.278	0.422	0.072	3.169	0.138	0.902	0.622	0.015	0.016	0.012
	L_7	89.92	3.202	1.278	0.426	0.072	3.194	0.138	0.917	0.658	0.015	0.014	0.012
	L_8	90.06	3.265	1.295	0.422	0.072	3.235	0.141	0.906	0.628	0.014	0.014	0.012
	L_9	89.78	3.168	1.256	0.413	0.070	3.116	0.132	0.906	0.638	0.014	0.014	0.011
	L_{10}	90.10	3.224	1.280	0.421	0.071	3.230	0.136	0.898	0.628	0.011	0.013	0.012
	L_{11}	90.25	3.240	1.278	0.434	0.070	3.210	0.134	0.868	0.621	0.012	0.012	0.014
	L_{12}	90.00	3.206	1.271	0.422	0.072	3.182	0.142	0.898	0.632	0.010	0.014	0.010
	L_{13}	89.88	3.204	1.279	0.432	0.072	3.172	0.132	0.864	0.620	0.010	0.018	0.011
	L_{14}	90.03	3.228	1.257	0.427	0.068	3.190	0.135	0.904	0.623	0.011	0.013	0.008
	L_{15}	89.96	3.204	1.286	0.418	0.070	3.174	0.136	0.882	0.613	0.011	0.013	0.011
	L_{16}	90.02	3.203	1.271	0.425	0.072	3.202	0.132	0.900	0.634	0.013	0.015	0.011
	L_{17}	89.79	3.214	1.284	0.418	0.070	3.204	0.135	0.908	0.656	0.011	0.012	0.010
Average	$(\bar{\bar{x}})$	89.976	3.2281	1.2741	0.4249	0.0709	3.1905	0.1358	0.9006	0.6314	0.0120	0.0139	0.0112
Reproducibility	$S_{\bar{x}}$	0.149	0.0452	0.0107	0.0088	0.0012	0.0267	0.0030	0.0166	0.0123	0.0020	0.0017	0.0013
(within laboratory) *1	$S_{I(T)}$	0.085	0.016	0.0117	0.0025	0.0011	0.0137	0.0029	0.0043	0.0073	0.0006	0.0009	0.0011
Uncertainty *2	U_{CRM}	0.08	0.023	0.005	0.004	0.001	0.014	0.002	0.009	0.006	0.001	0.001	0.001

(Note) ＊1 $S_{I(T)}$ is intermediate precision without a time condition.　＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

(1) List of laboratories ： Krosaki Harima Corporation, Shinagawa Refractories Co, Ltd, TYK Corporation, AGC Ceramics Co, Ltd, Okayama Ceramics Research Foundation, TOSHIBA NANOANALYSIS CORPORATION, JFE Techno-Research Corporation, Sumika Chemical Analysis Service, Ltd., Hitachi Power Solutions Co, Ltd, Taiko Refractories Co., Ltd, Nihon Tokushu Rozai Co., Ltd, Rigaku Corporation

(2) Analytical techniques ：JIS R 2212-2 (Method for chemical analysis of refractory products－Part 2:Silica refractories) (L_1-L_9) and ISO 12677 (Chemical analysis of refractory products by X-ray fluorescence (XRF)－Fused cast-bead method) (L_{10}-L_{17})

(3) Analytical values ： Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values.

(4) Outlier tests were carried out by Grubbs test. The samples rejected by Grubbs tests were discussed in view of analytical techniques and it was determined whether the outliers should be adopted or not.

(5) Date of preparation ： March, 2011

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２２６　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		91.29	2.634	2.992	0.296	0.029	0.973	0.096	0.193	0.475	0.238	0.245	0.320
Laboratories	L_1	91.36	2.634	3.044	0.296	0.032	1.028	0.094	0.206	0.474	0.250	0.250	0.331
	L_2	91.36	2.622	3.015	0.296	0.031	0.974	0.094	0.198	0.485	0.240	0.240	0.308
	L_3	91.25	2.688	3.028	0.297	0.029	1.006	0.092	0.199	0.460	0.234	0.243	0.332
	L_4	91.24	2.750	3.008	0.292	0.026	0.966	0.094	0.206	0.470	0.236	0.248	0.332
	L_5	91.42	2.654	3.008	0.298	0.029	0.970	0.096	0.208	0.492	0.236	0.252	0.337
	L_6	91.32	2.624	3.004	0.306	0.028	0.947	0.097	0.198	0.484	0.248	0.248	0.331
	L_7	91.20	2.626	3.030	0.298	0.030	1.001	0.097	0.195	0.472	0.232	0.248	0.267
	L_8	91.24	2.612	3.005	0.296	0.030	0.940	0.098	0.188	0.452	0.236	0.256	0.260
	L_9	91.30	2.620	2.982	0.288	0.029	0.981	0.100	0.180	0.476	0.238	0.242	0.330
	L_{10}	91.40	2.624	2.988	0.300	0.028	0.972	0.100	0.178	0.472	0.240	0.238	0.327
	L_{11}	91.14	2.622	2.957	0.291	0.030	0.966	0.103	0.178	0.476	0.239	0.246	0.330
	L_{12}	91.11	2.605	2.950	0.302	0.030	0.962	0.092	0.191	0.470	0.234	0.242	0.326
	L_{13}	91.44	2.634	2.930	0.298	0.028	0.970	0.099	0.197	0.472	0.234	0.248	0.322
	L_{14}	91.44	2.610	2.980	0.289	0.028	0.958	0.098	0.183	0.464	0.228	0.234	0.321
	L_{15}	91.30	2.580	2.938	0.294	0.028	0.970	0.094	0.196	0.482	0.239	0.246	0.334
	L_{16}	91.06	2.636	3.008	0.290	0.022	0.964	0.088	0.192	0.498	0.236	0.240	0.326
Average	$(\bar{\bar{x}})$	91.286	2.6338	2.9922	0.2957	0.0286	0.9734	0.0960	0.1933	0.4749	0.2375	0.2451	0.3196
Reproducibility	$s_{\bar{x}}$	0.118	0.0386	0.0337	0.0049	0.0023	0.0220	0.0038	0.0097	0.0116	0.0055	0.0056	0.0229
(within laboratory)*1	$s_{I(T)}$	0.109	0.0170	0.0159	0.0018	0.0007	0.0100	0.0020	0.0031	0.0031	0.0034	0.0030	0.0063
Uncertainty*2	U_{CRM}	0.06	0.021	0.018	0.003	0.001	0.012	0.002	0.005	0.006	0.003	0.003	0.012

(Note) * 1 $s_{I(T)}$ is intermediate precision without a time condition.　　* 2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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(2) Analytical techniques :JIS R 2212-2 (Method for chemical analysis of refractory products－Part 2:Silica refractories) (L_1-L_8) and ISO 12677 (Chemical analysis of refractory products by X-ray fluorescence (XRF)－Fused cast-bead method) (L_9-L_{16})

(3) Analytical values : Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values from the February 22, 2008 v20080222 version on.

(4) Outlier tests were carried out by Grubbs test. The samples rejected by Grubbs tests were discussed in view of analytical techniques and it was determined whether the outliers should be adopted or not.

(5) Date of preparation : March, 2015

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２２７　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		92.97	1.660	0.810	0.092	0.238	2.418	0.057	0.058	0.112	0.003	0.454	0.883
Laboratories	L_1	93.30	1.661	0.834	0.092	0.242	2.390	0.060	0.066	0.115	0.004	0.461	0.874
	L_2	93.02	1.638	0.798	0.088	0.232	2.416	0.054	0.072	0.113	0.005	0.442	0.851
	L_3	92.98	1.696	0.804	0.094	0.238	2.507	0.053	0.053	0.111	0.003	0.432	0.904
	L_4	93.01	1.690	0.843	0.092	0.244	2.449	0.056	0.062	0.110	0.006	0.462	0.902
	L_5	93.10	1.658	0.821	0.094	0.242	2.421	0.056	0.064	0.114	0.003	0.474	0.908
	L_6	93.16	1.684	0.810	0.092	0.234	2.408	0.056	0.063	0.111	0.002	0.456	0.880
	L_7	92.96	1.710	0.828	0.093	0.244	2.380	0.056	0.063	0.111	0.006	0.464	0.878
	L_8	92.88	1.620	0.784	0.090	0.236	2.362	0.056	0.064	0.110	0.004	0.471	0.878
	L_9	92.94	1.643	0.824	0.093	0.241	2.440	0.060	0.044	0.110	0.002	0.450	0.880
	L_{10}	92.97	1.670	0.794	0.094	0.236	2.426	0.063	0.048	0.112	0.004	0.451	0.882
	L_{11}	92.75	1.646	0.803	0.092	0.242	2.410	0.062	0.045	0.111	0.002	0.460	0.882
	L_{12}	92.86	1.643	0.796	0.096	0.242	2.404	0.054	0.062	0.109	0.002	0.454	0.880
	L_{13}	92.94	1.666	0.794	0.093	0.230	2.420	0.061	0.058	0.108	0.002	0.450	0.878
	L_{14}	92.83	1.633	0.810	0.091	0.232	2.398	0.058	0.048	0.107	0.004	0.438	0.882
	L_{15}	93.00	1.634	0.806	0.090	0.238	2.426	0.057	0.066	0.116	0.002	0.453	0.889
	L_{16}	92.86	1.668	0.812	0.092	0.228	2.427	0.058	0.056	0.116	0.003	0.443	0.877
Average	$(\bar{\bar{x}})$	92.972	1.6600	0.8101	0.0922	0.2376	2.4178	0.0571	0.0584	0.1115	0.0034	0.4538	0.8828
Reproducibility	$s_{\bar{x}}$	0.134	0.0255	0.0162	0.0019	0.0052	0.0324	0.0030	0.0084	0.0027	0.0014	0.0115	0.0134
(within laboratory)*1	$s_{I(T)}$	0.111	0.0113	0.0051	0.0010	0.0033	0.0123	0.0017	0.0020	0.0012	0.0007	0.0076	0.0082
Uncertainty*2	U_{CRM}	0.07	0.014	0.009	0.001	0.003	0.017	0.002	0.005	0.001	0.001	0.006	0.007

(Note) ＊1 $s_{I(T)}$ is intermediate precision without a time condition.　＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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(2) Analytical techniques ：JIS R 2212-2 (Method for chemical analysis of refractory products－Part 2:Silica refractories) (L_1-L_8) and ISO 12677 (Chemical analysis of refractory products by X-ray fluorescence (XRF)－Fused cast-bead method) (L_9-L_{16})

(3) Analytical values ： Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values from the February 22, 2008 v20080222 version on.

(4) Outlier tests were carried out by Grubbs test. The samples rejected by Grubbs tests were discussed in view of analytical techniques and it was determined whether the outliers should be adopted or not.

(5) Date of preparation : March, 2015

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２２８　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		93.89	0.398	0.088	1.211	0.035	1.785	0.119	1.188	0.106	0.991	0.085	0.011
Laboratories	L_1	93.81	0.397	0.078	1.194	0.036	1.786	0.121	1.223	0.104	0.994	0.086	0.009
	L_2	93.80	0.400	0.098	1.239	0.037	1.772	0.118	1.224	0.104	0.991	0.083	0.006
	L_3	93.86	0.396	0.094	1.216	0.032	1.788	0.112	1.151	0.108	0.986	0.082	0.008
	L_4	93.83	0.394	0.094	1.214	0.034	1.775	0.118	1.140	0.110	1.014	0.080	0.007
	L_5	94.06	0.395	0.087	1.212	0.034	1.784	0.116	1.202	0.103	0.961	0.085	0.009
	L_6	93.65	0.406	0.096	1.235	0.036	1.781	0.122	1.192	0.110	1.020	0.084	0.011
	L_7	93.80	0.397	0.088	1.192	0.036	1.774	0.122	1.182	0.105	1.010	0.086	0.007
	L_8	93.56	0.397	0.084	1.200	0.036	1.774	0.128	1.145	0.103	0.987	0.085	0.010
	L_9	94.01	0.386	0.094	1.196	0.035	1.808	0.120	1.218	0.104	0.992	0.086	0.014
	L_{10}	94.06	0.406	0.085	1.230	0.034	1.796	0.118	1.148	0.118	1.002	0.082	0.014
	L_{11}	93.86	0.395	0.086	1.198	0.036	1.782	0.117	1.203	0.104	1.001	0.088	0.013
	L_{12}	93.98	0.390	0.080	1.236	0.036	1.780	0.114	1.160	0.102	0.984	0.086	0.014
	L_{13}	93.86	0.416	0.088	1.214	0.034	1.788	0.121	1.210	0.103	0.982	0.086	0.012
	L_{14}	94.22	0.386	0.084	1.196	0.035	1.781	0.119	1.194	0.103	0.958	0.082	0.014
	L_{15}	93.90	0.412	0.090	1.211	0.036	1.795	0.120	1.212	0.108	1.000	0.088	0.014
	L_{16}	94.05	0.398	0.090	1.192	0.034	1.791	0.120	1.212	0.106	0.980	0.086	0.011
Average	$(\bar{\bar{x}})$	93.894	0.3982	0.0885	1.2109	0.0351	1.7847	0.1191	1.1885	0.1059	0.9914	0.0847	0.0108
Reproducibility	$s_{\bar{x}}$	0.165	0.0083	0.0057	0.0166	0.0013	0.0096	0.0036	0.0300	0.0041	0.0170	0.0023	0.0029
(within laboratory)*1	$s_{I(T)}$	0.150	0.0049	0.0016	0.0083	0.0010	0.0142	0.0021	0.0104	0.0013	0.0072	0.0012	0.0011
Uncertainty*2	U_{CRM}	0.09	0.004	0.003	0.009	0.001	0.005	0.002	0.016	0.002	0.009	0.001	0.002

(Note) ＊1 $s_{I(T)}$ is intermediate precision without a time condition.　　＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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(3) Analytical values ： Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values from the February 22, 2008 v20080222 version on.

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(5) Date of preparation : March, 2015

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２２９　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		95.74	1.174	0.190	0.121	0.074	1.412	0.468	0.073	0.079	0.017	0.374	0.201
Laboratories	L_1	95.83	1.174	0.202	0.120	0.075	1.422	0.472	0.078	0.082	0.018	0.404	0.198
	L_2	95.61	1.180	0.196	0.118	0.072	1.405	0.465	0.083	0.080	0.018	0.366	0.191
	L_3	95.84	1.192	0.192	0.124	0.076	1.409	0.472	0.080	0.082	0.017	0.362	0.208
	L_4	95.74	1.174	0.198	0.120	0.074	1.405	0.464	0.082	0.082	0.017	0.376	0.214
	L_5	95.78	1.178	0.195	0.122	0.076	1.423	0.475	0.076	0.080	0.018	0.383	0.213
	L_6	95.79	1.182	0.190	0.122	0.072	1.405	0.473	0.074	0.078	0.017	0.358	0.214
	L_7	95.84	1.192	0.196	0.124	0.076	1.439	0.474	0.074	0.078	0.020	0.380	0.196
	L_8	95.98	1.155	0.184	0.116	0.073	1.356	0.465	0.074	0.077	0.017	0.372	0.196
	L_9	95.66	1.158	0.191	0.120	0.076	1.434	0.455	0.054	0.078	0.014	0.370	0.199
	L_{10}	95.68	1.176	0.176	0.125	0.074	1.420	0.467	0.060	0.080	0.017	0.364	0.202
	L_{11}	95.62	1.172	0.188	0.120	0.076	1.412	0.470	0.060	0.077	0.014	0.383	0.199
	L_{12}	95.49	1.160	0.174	0.122	0.076	1.402	0.464	0.074	0.076	0.016	0.376	0.197
	L_{13}	95.96	1.185	0.187	0.123	0.074	1.417	0.466	0.072	0.076	0.017	0.374	0.196
	L_{14}	95.60	1.158	0.185	0.119	0.074	1.404	0.465	0.065	0.074	0.016	0.366	0.195
	L_{15}	95.66	1.162	0.190	0.118	0.074	1.418	0.472	0.078	0.084	0.017	0.378	0.202
	L_{16}	95.70	1.186	0.190	0.122	0.066	1.422	0.464	0.084	0.078	0.016	0.370	0.198
Average	$(\bar{\bar{x}})$	95.736	1.1740	0.1896	0.1209	0.0740	1.4121	0.4677	0.0730	0.0789	0.0168	0.3739	0.2011
Reproducibility	$s_{\bar{\bar{x}}}$	0.134	0.0123	0.0075	0.0025	0.0026	0.0185	0.0052	0.0089	0.0027	0.0015	0.0109	0.0072
(within laboratory)*1	$s_{I(T)}$	0.152	0.0069	0.0034	0.0020	0.0012	0.0076	0.0018	0.0010	0.0010	0.0006	0.0056	0.0024
Uncertainty*2	U_{CRM}	0.07	0.007	0.004	0.001	0.001	0.010	0.003	0.005	0.001	0.001	0.006	0.004

(Note) * 1 $s_{I(T)}$ is intermediate precision without a time condition. * 2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{\bar{x}}} / (\sqrt{\ell}$ = number of laboratories)

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Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２３０　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		97.78	0.180	0.701	0.033	0.121	0.608	0.016	0.076	0.028	0.388	0.057	0.001
Laboratories	L_1	97.92	0.181	0.704	0.032	0.122	0.607	0.016	0.082	0.030	0.393	0.058	0.000
	L_2	97.75	0.182	0.693	0.032	0.116	0.603	0.015	0.088	0.029	0.370	0.053	—
	L_3	97.84	0.193	0.700	0.034	0.120	0.600	0.016	0.084	0.028	0.388	0.055	—
	L_4	97.86	0.190	0.718	0.033	0.122	0.612	0.018	0.080	0.028	0.394	0.064	—
	L_5	97.82	0.188	0.714	0.034	0.122	0.605	0.017	0.079	0.028	0.378	0.064	—
	L_6	97.66	0.183	0.699	0.034	0.121	0.607	0.016	0.078	0.028	0.386	0.052	—
	L_7	97.63	0.180	0.707	0.033	0.122	0.594	0.016	0.078	0.028	0.397	0.055	—
	L_8	98.12	0.182	0.681	0.033	0.120	0.606	0.016	0.081	0.028	0.404	0.056	—
	L_9	97.73	0.158	0.708	0.032	0.122	0.623	0.018	0.062	0.028	0.388	0.056	0.002
	L_{10}	97.79	0.184	0.687	0.034	0.118	0.614	0.016	0.061	0.030	0.392	0.054	0.001
	L_{11}	97.62	0.172	0.699	0.034	0.123	0.611	0.016	0.064	0.028	0.390	0.058	0.001
	L_{12}	97.59	0.166	0.687	0.032	0.122	0.605	0.013	0.077	0.028	0.383	0.056	0.002
	L_{13}	98.03	0.184	0.696	0.034	0.118	0.614	0.017	0.076	0.028	0.383	0.056	0.001
	L_{14}	97.84	0.180	0.702	0.034	0.118	0.602	0.014	0.068	0.025	0.370	0.053	0.002
	L_{15}	97.66	0.188	0.704	0.030	0.122	0.614	0.016	0.081	0.033	0.392	0.060	0.002
	L_{16}	97.60	0.176	0.714	0.032	0.122	0.616	0.017	0.076	0.029	0.384	0.055	—
Average	$(\bar{\bar{x}})$	97.779	0.1804	0.7008	0.0329	0.1206	0.6083	0.0161	0.0757	0.0285	0.3880	0.0566	0.0014
Reproducibility	$s_{\bar{x}}$	0.155	0.0090	0.0104	0.0012	0.0021	0.0071	0.0013	0.0082	0.0016	0.0084	0.0035	0.0007
(within laboratory) *1	$s_{I(T)}$	0.098	0.0035	0.0043	0.0014	0.0016	0.0057	0.0012	0.0023	0.0007	0.0028	0.0016	0.0008
Uncertainty *2	U_{CRM}	0.08	0.005	0.006	0.001	0.001	0.004	0.001	0.004	0.001	0.004	0.002	0.001

(Note) ＊1 $s_{I(T)}$ is intermediate precision without a time condition.　＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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(2) Analytical techniques ：JIS R 2212-2 (Method for chemical analysis of refractory products－Part 2:Silica refractories) (L_1-L_8) and ISO 12677 (Chemical analysis of refractory products by X-ray fluorescence (XRF)－Fused cast-bead method) (L_9-L_{16})

(3) Analytical values ： Each value is the average of two values obtained by two measurements on different days. These analysis values are shown converted into LOI (Loss on ignition) component free values from the February 22, 2008 v20080222 version on.

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(5) Date of preparation : March, 2015

The Technical Association of Refractories, Japan

Certified Reference Material Series for X-ray Fluorescence Analysis of Refractories

ＪＲＲＭ　２３１　(Silica Refractory)

Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		98.61	0.630	0.049	0.003	0.004	0.005	0.004	0.006	0.004	0.001	0.188	0.383
Laboratories	L_1	98.65	0.630	0.053	0.003	0.004	0.004	0.004	0.009	0.004	0.001	0.195	0.378
	L_2	98.72	0.630	0.058	0.002	0.004	0.004	0.003	0.006	0.004	0.004	0.188	0.360
	L_3	98.69	0.646	0.048	0.002	0.004	0.006	0.003	0.006	0.003	0.001	0.189	0.401
	L_4	98.66	0.638	0.052	0.003	0.004	0.003	0.005	0.006	0.004	－	0.190	0.402
	L_5	98.73	0.632	0.052	0.004	0.004	0.006	0.004	0.006	0.004	－	0.190	0.394
	L_6	98.74	0.636	0.043	0.004	0.004	0.002	0.002	0.004	0.002	0.004	0.176	0.400
	L_7	98.68	0.652	0.050	0.004	0.004	0.005	0.004	0.006	0.004	0.001	0.188	0.356
	L_8	98.68	0.606	0.046	0.003	0.005	0.006	0.004	0.006	0.003	－	0.194	0.369
	L_9	98.54	0.614	0.051	0.003	0.005	0.004	0.005	0.003	0.002	0.002	0.186	0.386
	L_{10}	98.40	0.630	0.046	0.004	0.004	0.006	0.007	－	0.006	0.000	0.184	0.390
	L_{11}	98.50	0.624	0.047	0.004	0.005	0.005	0.006	－	0.003	－	0.191	0.386
	L_{12}	98.15	0.616	0.042	0.002	0.005	0.004	－	0.004	0.003	－	0.189	0.382
	L_{13}	98.96	0.644	0.050	0.006	0.005	0.005	0.003	0.004	0.003	0.000	0.190	0.382
	L_{14}	98.44	0.620	0.048	0.004	0.004	0.004	－	－	－	0.000	0.186	0.373
	L_{15}	98.67	0.625	0.051	0.001	0.004	0.004	0.004	0.009	0.008	0.002	0.189	0.394
	L_{16}	98.54	0.640	0.048	0.002	0.006	0.006	0.005	0.011	0.003	0.000	0.186	0.382
Average	$(\bar{\bar{x}})$	98.609	0.6302	0.0491	0.0032	0.0044	0.0046	0.0042	0.0062	0.0037	0.0014	0.1882	0.3834
Reproducibility	$s_{\bar{x}}$	0.182	0.0125	0.0040	0.0012	0.0006	0.0012	0.0013	0.0023	0.0015	0.0015	0.0043	0.0138
(within laboratory)*1	$s_{I(T)}$	0.105	0.0050	0.0025	0.0008	0.0004	0.0008	0.0011	0.0012	0.0009	0.0007	0.0015	0.0045
Uncertainty*2	U_{CRM}	0.10	0.007	0.002	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.002	0.007

(Note) ＊1 $s_{I(T)}$ is intermediate precision without a time condition.　＊2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times s_{\bar{x}} / \sqrt{\ell}$ (ℓ = number of laboratories)

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Results of Analyses

Unit : mass%

Constituent		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	ZrO_2
Certified value		99.7$_7$	0.05$_2$	0.05$_3$	0.00$_2$	0.00$_5$	0.00$_4$	0.00$_1$	0.00$_5$	0.00$_4$	0.00$_1$	0.00$_2$	0.00$_1$
Laboratories	L_1	99.8$_6$	0.05$_4$	0.05$_6$	0.00$_3$	0.00$_5$	0.00$_6$	0.00$_1$	0.00$_8$	0.00$_4$	0.00$_0$	0.00$_1$	0.00$_2$
	L_2	99.8$_6$	0.05$_3$	0.05$_9$	0.00$_2$	0.00$_5$	0.00$_4$	0.00$_0$	0.00$_4$	0.00$_4$	0.00$_2$	0.00$_1$	—
	L_3	99.7$_5$	0.05$_6$	0.05$_4$	0.00$_1$	0.00$_4$	0.00$_4$	—	0.00$_4$	0.00$_3$	—	0.00$_1$	—
	L_4	99.8$_4$	0.05$_6$	0.05$_6$	0.00$_3$	0.00$_5$	0.00$_9$	—	0.00$_4$	0.00$_3$	—	—	—
	L_5	99.8$_0$	0.05$_4$	0.05$_8$	0.00$_4$	0.00$_5$	0.00$_4$	—	0.00$_6$	0.00$_4$	—	0.00$_4$	—
	L_6	99.8$_0$	0.05$_6$	0.05$_0$	0.00$_4$	0.00$_5$	0.00$_3$	—	0.00$_4$	0.00$_3$	0.00$_2$	0.00$_2$	—
	L_7	99.8$_2$	0.05$_3$	0.05$_2$	0.00$_2$	0.00$_5$	0.00$_4$	0.00$_1$	0.00$_4$	0.00$_3$	0.00$_6$	0.00$_1$	—
	L_8	99.8$_7$	0.05$_5$	0.04$_8$	0.00$_2$	0.00$_5$	0.00$_5$	—	0.00$_6$	0.00$_3$	—	0.00$_1$	—
	L_9	99.8$_0$	0.02$_4$	0.06$_1$	0.00$_2$	0.00$_5$	0.00$_2$	0.00$_0$	0.00$_4$	0.00$_2$	—	0.00$_1$	—
	L_{10}	99.6$_4$	0.04$_9$	0.04$_8$	0.00$_3$	0.00$_5$	0.00$_4$	0.00$_2$	—	0.00$_6$	0.00$_0$	0.00$_0$	0.00$_0$
	L_{11}	99.7$_2$	0.04$_0$	0.05$_0$	0.00$_2$	0.00$_5$	0.00$_4$	0.00$_2$	—	0.00$_4$	—	0.00$_2$	—
	L_{12}	99.5$_4$	0.03$_4$	0.04$_4$	0.00$_1$	0.00$_5$	0.00$_3$	—	0.00$_2$	0.00$_2$	—	0.00$_2$	—
	L_{13}	—	0.05$_2$	0.05$_2$	0.00$_2$	0.00$_5$	0.00$_3$	0.00$_0$	0.00$_2$	0.00$_3$	0.00$_0$	0.00$_1$	—
	L_{14}	—	0.07$_2$	0.05$_1$	0.00$_1$	0.00$_5$	0.00$_3$	—	—	—	—	0.00$_1$	—
	L_{15}	99.6$_8$	0.06$_1$	0.05$_4$	0.00$_0$	0.00$_4$	0.00$_1$	0.00$_3$	0.00$_8$	0.00$_8$	0.00$_0$	0.00$_4$	0.00$_0$
	L_{16}	99.7$_6$	0.05$_6$	0.05$_2$	0.00$_3$	0.00$_5$	0.00$_5$	0.00$_2$	0.00$_8$	0.00$_6$	0.00$_0$	0.00$_1$	—
Average	$(\bar{x})$	99.76$_7$	0.051$_6$	0.052$_8$	0.002$_2$	0.004$_9$	0.004$_0$	0.001$_2$	0.004$_9$	0.003$_9$	0.001$_2$	0.001$_5$	0.000$_7$
Reproducibility	$S_{\bar{x}}$	0.09$_5$	0.011$_0$	0.004$_5$	0.001$_1$	0.000$_3$	0.001$_8$	0.001$_1$	0.002$_1$	0.001$_6$	0.002$_1$	0.001$_1$	0.001$_2$
(within laboratory) *1	$S_{I(T)}$	0.07$_2$	0.011$_3$	0.002$_2$	0.000$_8$	0.000$_2$	0.000$_7$	0.001$_1$	0.001$_2$	0.000$_4$	0.000$_5$	0.000$_5$	0.000$_6$
Uncertainty *2	U_{CRM}	0.0$_5$	0.00$_6$	0.00$_2$	0.00$_1$	0.00$_0$	0.00$_1$	0.00$_1$	0.00$_1$	0.00$_1$	0.00$_2$	0.00$_1$	0.00$_3$

(Note) * 1 $S_{I(T)}$ is intermediate precision without a time condition. * 2 Uncertainty $U_{CRM} = t_{\ell-1,0.05} \times S_{\bar{x}} / (\sqrt{\ell}$ = number of laboratories)

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