

National Bureau of Standards Certificate

Standard Reference Material 1823

Refractive Index Silicone Liquids

This standard consists of two silicone liquids that are chemically and thermally stable. The liquids are miscible and span the refractive index range of a variety of glasses and glass fibers that are examined microscopically by immersion techniques. Used independently the liquids are suitable for the calibration of refractometers.

Refractive Index vs Temperature
 and Wavelength

	Spectral Source	Wavelength in Micro-meters, μm	Refractive Index			
			20 °C	40 °C	60 °C	80 °C
1823 I	Mercury, g	0.4358	1.53751	1.52897	1.52043	1.51166
	Cadmium	0.4678	1.53145	1.52301	1.51454	1.50587
	Cadmium, F'	0.4800	1.52949	1.52110	1.51273	1.50407
	Hydrogen, F	0.4861	1.52859	1.52019	1.51176	1.50318
	Mercury, e	0.5461	1.52140	1.51315	1.50485	1.49634
	Helium, d	0.5876	1.51780	1.50961	1.50139	1.49295
	Sodium, D ₁ , D ₂	0.5893 ^a	1.51767	1.50947	1.50119	1.49276
	Cadmium, C'	0.6438	1.51407	1.50593	1.49778	1.48939
	Hydrogen, C	0.6563	1.51339	1.50524	1.49707	1.48871
	Helium	0.6678	1.51279	1.50465	1.49648	1.48811
1823 II	Mercury, g	0.4358	1.58373	1.57519	1.56644	1.55763
	Cadmium	0.4678	1.57617	1.56779	1.55913	1.55042
	Cadmium, F'	0.4800	1.57379	1.56536	1.55682	1.54814
	Hydrogen, F	0.4861	1.57265	1.56425	1.55567	1.54702
	Mercury, e	0.5461	1.56382	1.55555	1.54712	1.53867
	Helium, d	0.5876	1.55941	1.55119	1.54282	1.53444
	Sodium, D ₁ , D ₂	0.5893 ^a	1.55925	1.55106	1.54265	1.53418
	Cadmium, C'	0.6438	1.55487	1.54673	1.53842	1.53009
	Hydrogen, C	0.6563	1.55403	1.54588	1.53757	1.52918
	Helium	0.6678	1.55330	1.54518	1.53693	1.52852

^aIntensity-weighted mean of doublet, D₁, D₂

The research and measurements leading to the certification were performed in the Optical Physics Division of the National Bureau of Standards.

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The homogeneity of each liquid was established by measuring the refractive indices of randomly selected samples. The refractive indices were measured by the classical minimum deviation method, using a water-jacketed hollow prism mounted on the table of a precision spectrometer. A thermistor sensor was immersed in the liquid during the measurements and temperature changes as small as 0.001 °C were monitored on a digital meter. Index determinations were made at or near 20, 40, 60 and 80 °C. Temperature coefficients, $\Delta n / \Delta T$, were computed and corrections were made to adjust to the exact temperatures that are listed in the tables. A statistical evaluation of the averaged index data for all samples yielded uncertainties in refractive index that are within $\pm 4 \times 10^{-5}$ refractive index units for SRM 1823 I, and within $\pm 5 \times 10^{-5}$ refractive index units for SRM 1823 II.