

National Bureau of Standards

Certificate

Standard Reference Material 2016

White Opal Glass Diffuse Spectral Reflectance Standard for the Visible Spectrum

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This Standard Reference Material (SRM) is intended for use in calibrating the photometric scale of integrating sphere reflectometer-spectrophotometers used in the measurement of spectral 6° /hemispherical reflectance. SRM 2016 is a 10-cm x 10-cm, fire-polished, white opal glass (vitrolite).

This SRM was measured at 10-nm intervals from 400 to 750 nm. The certified values were determined in the following way. The 6° /hemispherical diffuse reflectance factor of a master plate was measured on the NBS High Accuracy Reference Spectrophotometer for diffuse reflectance, using techniques for determining absolute reflectance values (reflectance relative to a perfect diffuser). This master plate was then used to transfer the absolute reflectance scale to the reflectance SRM through the use of a working plate and a high-precision recording spectrophotometer. The uncertainty in the values of absolute diffuse reflectance assigned to the master plate is 0.15 percent. The total uncertainty of the certified values of absolute diffuse reflectance is ± 1.0 percent at the 95 percent confidence level, the certified values for the "included specular component" are given in Table 1. Uncertified values for the "excluded specular component" are given for information only in Table 2.

The white opal glass can be cleaned with a mild liquid soap and warm water, followed by a rinse in distilled water. The fire-polished surface and the reflectance of the standard are very stable. However, care should be exercised in cleaning and handling to avoid scratching the polished surface. The standard should be stored in a covered glass enclosure when not in use.

This SRM is issued with a black felt covered aluminum plate. This black felt is to be placed against the back of the SRM when measuring its reflectance. The same black backing was used in calibrating the SRM at NBS. This white glass is translucent and may not be suitable as a reflectance standard for some reflectometers.

The calibration of this diffuse spectral reflectance standard was done in the Radiometric Physics Division of the Center for Radiation Research at NBS.

The technical and support aspects involved in the certification and issuance of SRM 2016 was coordinated through the Office of Standard Reference Materials by R.K. Kirby.

Each SRM 2016 is issued with individual Tables 1 and 2. THIS IS AN EXAMPLE.

SRM 2016

Table 2 Excluded Specular Component for Information Only (Not Certified)

Serial Number:

V6-G4001

λ	R	λ	R	λ	R	λ	R	λ	R
400.0	.8644240	410.0	.8580832	420.0	.8523369	430.0	.8532488	440.0	.8520655
450.0	.8607144	460.0	.8678965	470.0	.8716315	480.0	.8726315	490.0	.8757375
500.0	.8786304	510.0	.8815210	520.0	.8821519	530.0	.8838899	540.0	.8840386
550.0	.8829330	560.0	.8826742	570.0	.8831518	580.0	.8814131	590.0	.8786782
600.0	.8770478	610.0	.8745258	620.0	.8726317	630.0	.8700000	640.0	.8685281
650.0	.8675286	660.0	.8668963	670.0	.8660000	680.0	.8650000	690.0	.8643674
700.0	.8634486	710.0	.8618973	720.0	.8587980	730.0	.8567965	740.0	.8537975
750.0	.8517981								

UNIT OF WAVELENGTH=NANOMETER

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Table 1 Included Specular Component - Certified Value

Serial Number:

V6-G4001

λ	R	λ	R	λ	R	λ	R	λ	R	λ	R
400.0	.9058665	410.0	.8964863	420.0	.8921138	430.0	.8917428	440.0	.8904845		
450.0	.8986026	460.0	.9081052	470.0	.9108540	480.0	.9114785	490.0	.9144861		
500.0	.9161133	510.0	.9193724	520.0	.9223775	530.0	.9233776	540.0	.9222494		
550.0	.9222494	560.0	.9222494	570.0	.9212487	580.0	.9184973	590.0	.9162433		
600.0	.9146159	610.0	.9129888	620.0	.9101721	630.0	.9073549	640.0	.9053529		
650.0	.9047256	660.0	.9037245	670.0	.9030938	680.0	.9023500	690.0	.9013490		
700.0	.9007213	710.0	.8983461	720.0	.8963442	730.0	.8938578	740.0	.8918568		
750.0	.8898558										

UNIT OF WAVELENGTH=NANOMETER