

CERTIFICATE

PIKE 162-5450 INFRARED TRANSMISSION WAVELENGTH STANDARD CALIBRATION

Wavelength Range: 4,000 cm^{-1} to 400 cm^{-1}

Serial Number: 0692

Date of Calibration: September 8, 2014
NIST Wavelength Traceability: Calibrated against Master Standard traceable to NIST SRM-1921b,
Traceable Serial Number: 3145-3

Optical Arrangement: Transmission, Calibrating Instrument: Varian FTS 6000 S/N 42580
Environmental conditions: Temperature: 75°F Humidity: 47%RH

Natalie A Crothers

Calibration Performed: Natalie A. Crothers
Middleton Research

Material Traceability:

Procite®, low gloss, translucent, oriented polystyrene film. Manufacturer: Dow Chemical Company, Distributed by Interfilm Holdings, Inc. Piedmont SC 29673. Nominal thickness: 1.5 mil (38 μm). Optical gloss: 72 %, Haze: 18% (measured at 60 degrees).

Manufacturer:

PIKE Technologies, Inc Madison WI 53719

Calibration Performed:

Middleton Research, 8505 University Green, Middleton WI 53562, USA, (608) 831-2141

Annual recertification of this wavelength standard is recommended to ensure optimal performance and calibration accuracy.

Gina Stuessy

Approved: Gina Stuessy, Quality Review
Middleton Research

General

This Secondary Wavelength Standard is intended to establish the accuracy of the wavelength scale of spectrophotometers in the mid-infrared spectral range from 400 to 4000 cm^{-1} . The PIKE 162-5450 standard consists of a 1.5 mil matte polystyrene film mounted in a 2 in x 3 in card that can be inserted into the sample slide of various spectrophotometers.

Certification Procedure

This standard was certified against a NIST SRM-1921b standard (Expiration Date: 31-Dec-2014). A high precision calibrated Fourier-transform spectrophotometer is used to measure the NIST standard, the secondary master and all consequent secondary standards. Spectral bands of this standard are precisely located and tabulated in comparison to the secondary master, which in turn is measured and found to be equivalent to a NIST certified standard. The NIST traceability is documented. In addition, published NIST standard bands are also tabulated.

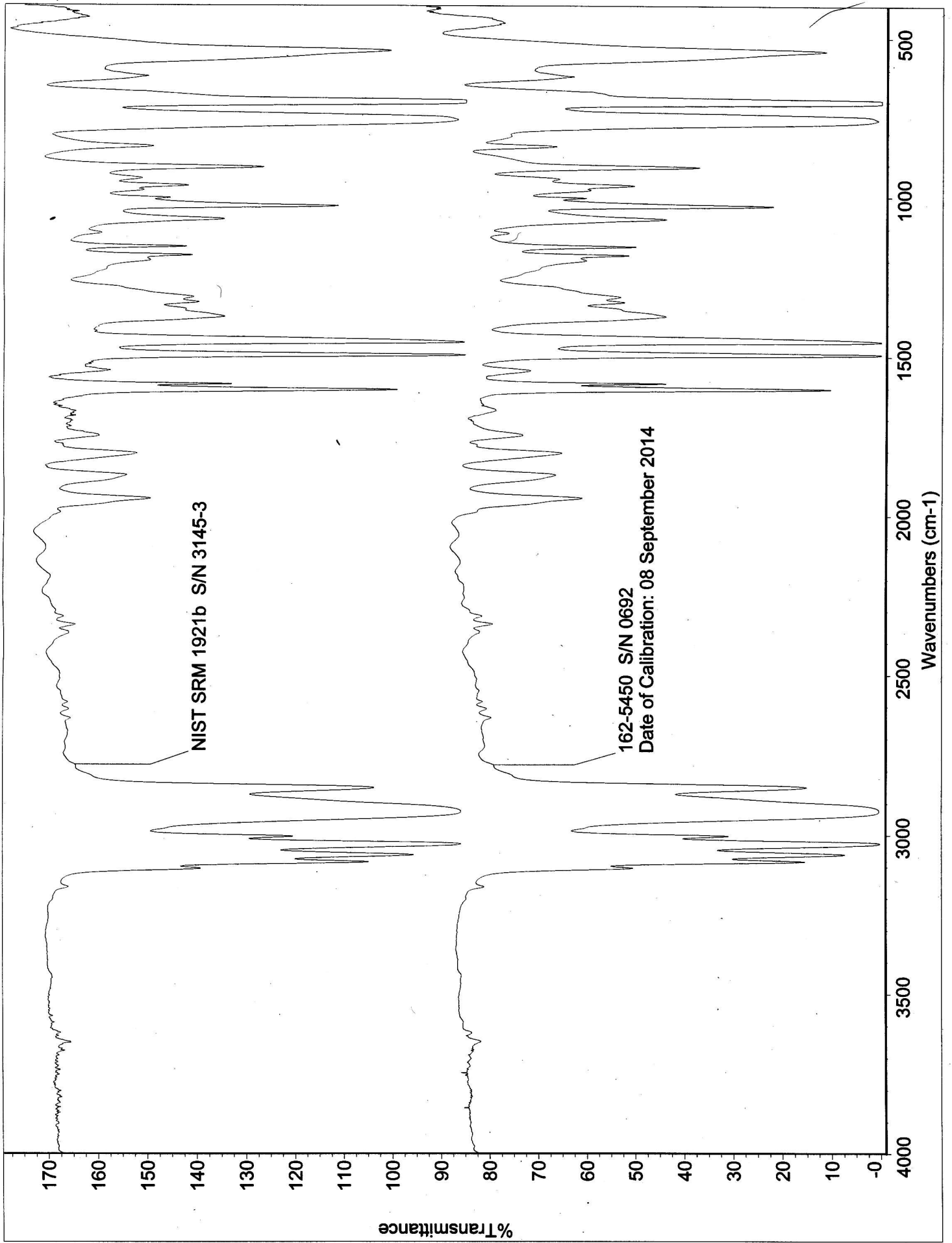
Attached transmittance spectrum recorded against air as background. Bands are corrected to vacuum, the preferred form NIST elected to publish their original measurement data. Due to potential changes from prolonged exposure to humidity and ambient conditions, the standard is certified for 18 months.

Handling Requirements

When not in use, return standard to its storage container. Improper handling, such as attempts to open the standard, scratching or contaminating the mounted polystyrene film or its holder may cause irreversible changes. This standard cannot be restored to its original condition by other than the manufacturer. Wear glove or finger cots to avoid fingerprints on the polystyrene film.

Applicable Documents

Measurement and Certification of Polystyrene Wavelength Standards: MRQ-WI-017



Infrared Transmission Wavelength Standard
Part Number 162-5450
Serial Number 0692

Band Assignment	Polystyrene Measured Band Position	Measured NIST SRM 1921b Band Position	Difference	Difference	Instrument Uncertainty	Instrument Uncertainty	Combined Expanded Uncertainty including NIST-provided max. uncertainty	Combined Expanded Uncertainty including NIST-provided max. uncertainty	NIST Reference [Ref 1-2.]	NIST Reference [Ref 1-2.]
	[cm ⁻¹]	[cm ⁻¹]	[cm ⁻¹]	[μm]	[cm ⁻¹]	[μm]	[cm ⁻¹]	[μm]	[cm ⁻¹]	[μm]
Effective Resolution:	4 cm ⁻¹	4 cm ⁻¹								
1	539.81	539.76	0.05	-0.002	0.064	0.002202	2.631	0.090	539.41	18.539
2	841.73	841.74	-0.01	0.000	0.020	0.000282	1.320	0.019	841.79	11.879
3	906.79	906.72	0.07	-0.001	0.008	0.000103	0.360	0.004	906.63	11.030
4	1028.42	1028.47	-0.05	0.000	0.005	0.000049	0.330	0.003	1028.27	9.725
5	1069.24	1069.34	-0.10	0.001	0.022	0.000191	0.990	0.009	1069.22	9.353
6	1154.67	1154.69	-0.02	0.000	0.006	0.000043	0.200	0.002	1154.50	8.662
7	1583.26	1583.23	0.03	0.000	0.005	0.000019	0.090	0.000	1582.98	6.317
8	1601.52	1601.50	0.02	0.000	0.005	0.000021	0.100	0.000	1601.29	6.245
9	1943.12	1942.91	0.21	-0.001	0.064	0.000170	0.663	0.002	1942.97	5.147
10	2849.63	2849.68	-0.05	0.000	0.007	0.000008	0.490	0.001	2849.48	3.509
11	3001.57	3001.56	0.01	0.000	0.009	0.000010	0.180	0.000	3001.20	3.332
12	3026.03	3026.02	0.01	0.000	0.012	0.000013	0.460	0.001	3025.99	3.305
13	3060.23	3060.23	0.00	0.000	0.008	0.000008	0.250	0.000	3060.16	3.268
14	3082.48	3082.49	-0.01	0.000	0.003	0.000003	0.160	0.000	3082.26	3.244

Maximum Difference	0.21	[cm ⁻¹]
Target maximum difference at all NIST bands	1.50	[cm ⁻¹]
<input checked="" type="checkbox"/> Calibration Passed		
<input type="checkbox"/> Calibration Failed		
8-Sep-2014	Date	
<i>MAC</i>	Initials	

- [Ref 1] Gupta,D,Wang L,Hanssen L.M,Hsia JJ, Datla R.V. Standard Reference Materials Polystyrene Films for Calibrating the Wavelength Scale of Infrared Spectrophotometers -SRM 1921; NIST Special Publication 260-122 (1995)
- [Ref 2] Hansen.L.M., Zhu,C., Wavenumber Standards for Mid-Infrared Spectrometry in Handbook of Vibrational Spectroscopy, J.Wiley&Sons, Vol.1,pp881-890(2002)