



Starna scientific
'Setting the Standard'

Quality Assurance in the Analytical Laboratory

Mid IR and NIR Spectrophotometer Wavelength and Resolution Qualification

Starna Polystyrene References

Purpose

These Reference Materials can be used to qualify Mid IR - FTIR spectrophotometers for wavelength accuracy over an operating range of 540 cm^{-1} to 9000 cm^{-1} ($1.1\text{ }\mu\text{m}$ to $18.5\text{ }\mu\text{m}$). One version of the product can also be used to qualify the resolution of a Mid IR instrument as required by some pharmacopoeias and for the wavelength qualification of ATR (Attenuated Total Reflectance) measurements in the Mid-IR. Another version has additional certified peaks in the NIR region.

Description and Discussion

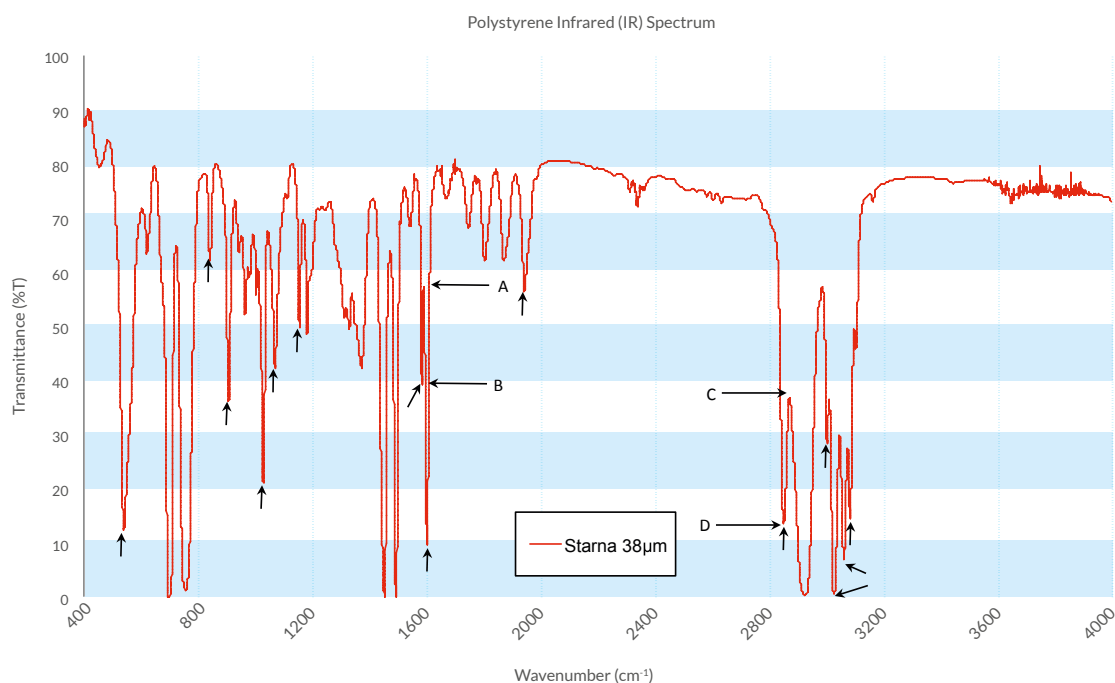
Mid IR ($540 - 3125\text{ cm}^{-1}$, $3.2 - 18.5\text{ }\mu\text{m}$): Starna reference RM-1921/38 consists of a $38\text{ }\mu\text{m}$ polystyrene film mounted in a card holder.

14 certified peaks (arrowed in spectrum below) are available for wavelength qualification purposes. The calibration values are traceable to NIST SRM 1921b



NOMINAL WAVENUMBER VALUES (cm^{-1})													
539	842	907	1028	1069	1155	1583	1601	1943	2849	3001	3026	3060	3082

The absorption minima and maxima at A and B, C and D can be used to qualify resolution according to pharmacopoeia requirements (EP/JP).



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Note: Pharmacopoeia compliance

Using this reference material, a MIR spectrophotometer may be judged to be pharmacopoeia compliant for the certified parameters if the following criteria are met:

European Pharmacopoeia compliance

The difference between the absorption minima at 2870 cm^{-1} and the maxima at 2849.5 cm^{-1} is greater than 0.3 (absorbance) and the difference between the absorption minima at 1589 cm^{-1} and the maxima at 1583 cm^{-1} is greater than 0.08 (absorbance). The latest revision of EP 2.2.24 cites the use of 38 μm polystyrene for the wavelength qualification of ATR (Attenuated Total Reflectance) instruments in the Mid-IR region.

Japanese Pharmacopoeia compliance

The depth of the trough from the maximum absorption at about 2850 cm^{-1} to the minimum at about 2870 cm^{-1} is not less than 18% transmittance and that from the maximum at about 1583 cm^{-1} to the minimum at about 1589 cm^{-1} is not less than 12% transmittance.

US Pharmacopoeia compliance

A wavenumber tolerance of $\pm 1.0 \text{ cm}^{-1}$ is allowed on the position of the following 3082.21 bands; 3060.0, 2849.5, 1942.9, 1601.2, 1583.0, 1154.5 and 1028.3 cm^{-1} .

TGA Australia compliance

TGA allows the use of either BP/EP or USP as appropriate.

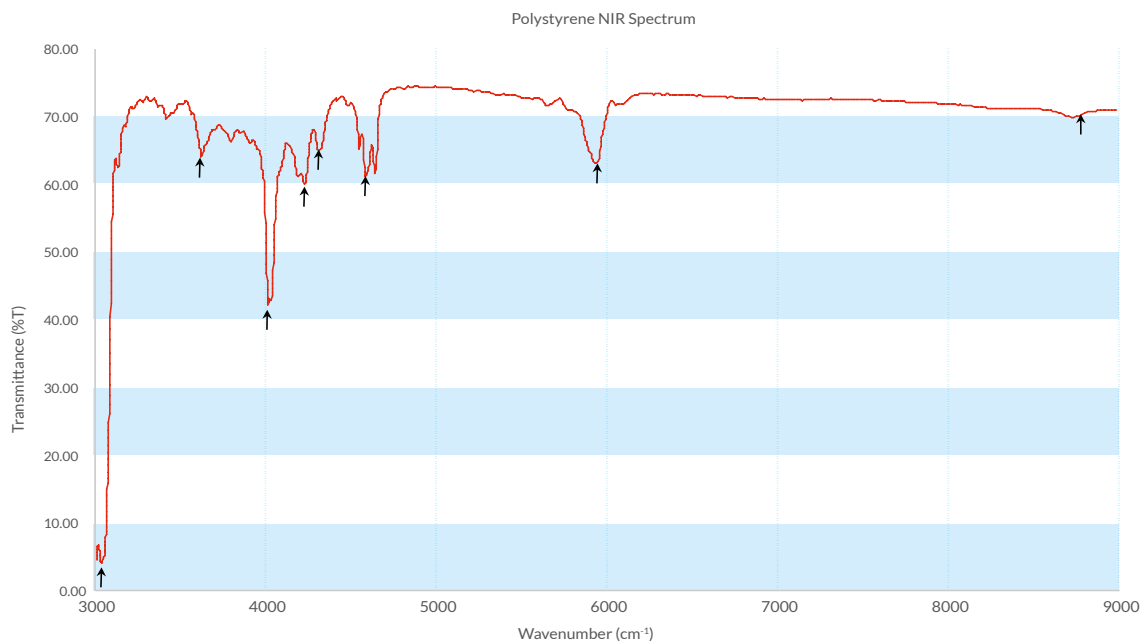
ATR (Attenuated Total Reflectance) references: Two versions of Starna reference RM-1921/38 are designed for use in ATR instrumentation. Available in disc (25mm dia.) or strip (9 x 3 cm) formats

Near IR (1.1 - 3.3 μm , 3000 - 9000 cm^{-1}): An alternative reference material, RM-1921/65, in addition to the 14 peaks in the MIR, has additional peaks on the NIR suitable for wavelength qualification.

Eight peaks (arrowed in the spectrum below) are available for wavelength qualification purposes. The calibration values are traceable to NIST SRM 2065.

Approximate wavelength values are:

NOMINAL WAVENUMBER/WAVELENGTH VALUES								
cm^{-1}	3064	3647	4039	4250	4335	4608	5952	8749
nm	3264	2742	2476	2353	2307	2170	1680	1143



Note: The values given in this data sheet are for guidance only. Because the absorption bands are asymmetric, measured values will be spectral bandwidth dependent. The Calibration Certificate accompanying each Starna Mid IR-FTIR Reference gives actual values measured at a bandwidth of 1.00 cm^{-1} , and only these certified values should be used for instrument qualification. Values for the NIR Reference are measured at a resolution of 0.4 nm. On request, Starna can provide certified values at other bandwidths.

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Certification and Documentation

A Certificate of Calibration and Traceability and full instructions for use are provided with each Reference Material. The certificate is supplied in electronic format, on a USB drive in the same box as the references, allowing hard copy to be produced on demand and giving easy interface to the user's own IT systems. Certification measurements are made on a reference spectrophotometer that has been qualified using Standard Reference Materials certified by the National Institute of Standards and Technology (NIST) in the USA, or against primary physical references such as elemental emission lines.

Accreditation

Starna Scientific is accredited to both ISO Guide 34 (4001) as a Reference Material producer, and ISO 17025 (0659) as a Calibration Laboratory for optical reference measurements. Starna Scientific's manufacturing facility is accredited to the ISO 9001 Quality Management System with BSI.

Warranty

STARNA offers a Lifetime Guarantee on all Starna reference materials, unless otherwise stated, such that any reference material that moves outside its published uncertainty budget will be replaced free of charge. This guarantee is subject to the reference materials being re-certified at least every three years and that the references have not been physically, thermally or optically abused. The STARNA UKAS accredited calibration laboratory aims to re-certify and despatch references within five working days from receipt.

How to Order

	CATALOGUE NUMBER
Starna Mid IR-FTIR Polystyrene Reference, 38 μm	RM-1921/38
Starna Mid IR-FTIR/NIR Polystyrene Reference, 65 μm	RM-1921/65
Starna Mid IR-FTIR Polystyrene Reference for ATR, 38 μm	RM-1921/38/ATR
Starna Mid IR-FTIR Polystyrene Reference for ATR, 38 μm , 3 x 9 cm strip	RM-1921/38/ATR/3x9



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