

## HIGH POWERED OBJECTIVE FOR THE CARY 620 FTIR IMAGING MICROSCOPE



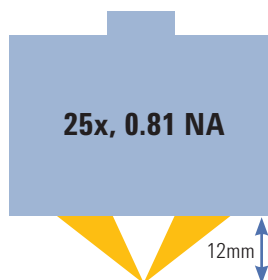
### Exceptional micro-imaging of the most challenging samples

Whether the FTIR imaging challenge is to measure single cells or to identify the smallest inclusions, having the best spatial resolution performance is crucial.

The new 25x, 0.81 numerical aperture (NA) objective is customized for Agilent's Cary 620 FTIR Imaging Microscope and delivers spatial resolution to 1-2 microns—while providing the largest working distance with enough flexibility to accept a range of stage accessories.

Ideal for the most challenging applications:

- Investigate live cells... in water!
- Obtain sub-cellular information from tissues and cells
- Analyze contaminants on electronic components
- Measure complex, thin polymer laminate films

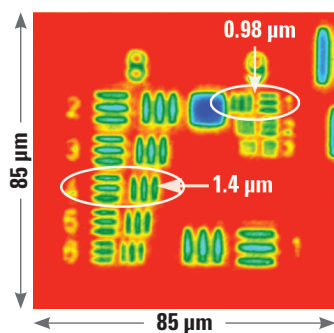


The 25x, 0.81 NA objective operates in reflection mode using a single objective, or transmission mode using a pair of matched objectives with the condenser on a pre-aligned plate for easy, quick, and alignment-free exchange.

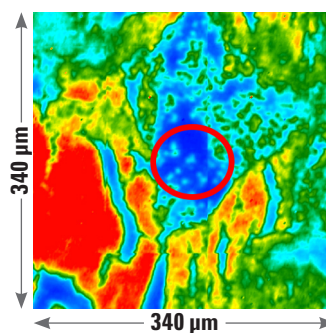
### 25x IR Objective for optimized spatial resolution with experimental flexibility

- Optically matched to the Cary 620 Imaging Microscope to deliver superior energy throughput for high analytical sensitivity
- Ultra-high 0.81 NA optics provides spatial resolution to 1-2 microns
- Working distance of 12 mm accommodates sampling accessories, such as environmental stages for heating/cooling or introduction of gases, and liquid cells for live cell imaging
- Use in either reflection or transmission mode
- Standard software controlled magnification switching provides for 3.3 micron and 0.66 micron pixel size options with the 25x objective
- Fast measurements across large FOVs, with extremely high spatial resolution

## The New 25x 0.81 NA Objective for the Cary 620 Microscope— provides the highest spatial resolution ever published



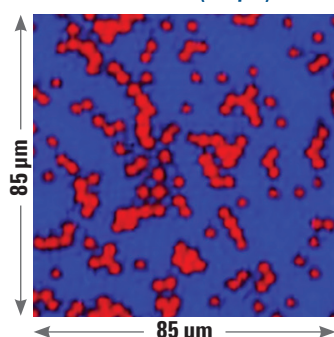
“Hi-res” version of the USAF target (containing groups 8 & 9) with the Rayleigh criterion (26.4% contrast) met with the 1.4  $\mu\text{m}$  width bars (group 8, element 4). Even group 9, element 1, which has bars with a width of 0.98 microns, can be resolved. This demonstrates the highest spatial resolution using FTIR microscopy ever published.



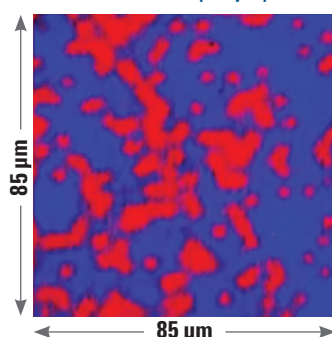
Breast tissue image generated using Amide I band (protein) at  $\sim 1650\text{ cm}^{-1}$ . The total FOV of this measurement is  $340 \times 340\ \mu\text{m}$ , with  $0.66\ \mu\text{m}$  pixel size, collected with  $8\text{ cm}^{-1}$  spectral resolution, 128 co-added scans and consists of a  $4 \times 4$  mosaic (16 tiles) using a  $128 \times 128$  FPA. Total

measurement time  $\sim 1$  hour. Individual cells of only 4-5 microns being clearly visible (circled area).

**Polystyrene,  $3024\text{ cm}^{-1}$  ( $3.3\ \mu\text{m}$ )**  
**PMMA,  $2950\text{ cm}^{-1}$  ( $3.4\ \mu\text{m}$ )**



**Polystyrene,  $1430\text{ cm}^{-1}$  ( $7.0\ \mu\text{m}$ )**  
**PMMA,  $1492\text{ cm}^{-1}$  ( $6.7\ \mu\text{m}$ )**



Mixture of 3 micron PMMA and polystyrene beads. Clear spatial separation was possible using the C-H stretching bands around  $3000\text{ cm}^{-1}$  ( $\sim 3\ \mu\text{m}$ ). Even using longer wavelength bands, such as the C-H bend around  $1430\text{-}1492\text{ cm}^{-1}$  ( $\sim 7\ \mu\text{m}$ ), 3 micron beads are still resolvable.

### Specifications and typical measured spatial resolution performance

Objective (mag mode)	25x, high mag	25x, standard mag
Pixel size	0.66	3.3
Total system magnification	61x	12x
Achieved spatial resolution <sup>1</sup> at $3750\text{ cm}^{-1}$ $\mu\text{m}$	1.4	4.3
Achieved spatial resolution <sup>1</sup> at $2500\text{ cm}^{-1}$ $\mu\text{m}$	1.7	5.0
Single Field of View (FOV) <sup>2</sup> $\mu\text{m}$	$85 \times 85$	$420 \times 420$

<sup>1</sup> Spatial Resolution measurements were conducted on a “hi res” version of the standard chrome-on-glass USAF resolution target with the calculation following the method of Lasch et al, Biochimica et Biophysica Acta 1758 (2006) 814–829.

<sup>2</sup> FOV is for a  $128 \times 128$  FPA. FOV scales proportionally with different FPA sizes. Larger measurement areas can be obtained by software controlled, automated stage stitching (mosaicing) of multiple FPA tiles.

### Ordering Information

Configuration	Part No.
FTIR 25x IR objective (reflection only)	K8071A
FTIR 25x IR objective (transmission and reflection)	K8072A

To learn more about the  
Agilent Cary 620 FTIR  
Imaging Microscope visit:  
[www.agilent.com/chem/cary620](http://www.agilent.com/chem/cary620)

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Published in USA, April 4, 2016  
5991-6755EN