Mid-IR IntegratIR

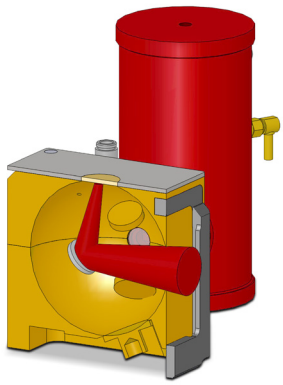
AT A GLANCE

- 3-inch sphere, gold-coated, Lambertian scatterer for high-performance measurements
- 12-degree hemispherical diffuse reflection measurement with specular exclusion port
- Diffuse transmission station for measurement of highly scattering samples
- Choice of integrated, high-performance detector MCT or DTGS for ultimate configurability
- Upward- and downward-looking optical configurations to accommodate a wide range of sample sizes and types
- In-sample-compartment design to minimize laboratory space requirements

The Mid-IR IntegratIR is an integrating sphere that is often used when studying reflection properties of solids, analyzing light-scattering and/or highly absorbing samples and collecting spectra that is difficult to obtain with standard sampling techniques.

OPTICAL DESIGNS

The Mid-IR IntegratIR™ spheres are available in upward- and downward-looking configurations and are suitable for the measurements of absolute and relative diffuse reflectance of solids, powders and opaque liquids. Both feature a 3-inch diameter, highly reflective gold-coated sphere. The spheres mount in the sample compartment of the FTIR spectrophotometer, and use a dedicated detector for maximum performance.



Optical diagram of the upward-looking IntegratIR.

The upward- and downward-looking mid-IR spheres feature a 12-degree illumination of the sample, and offer a specular exclusion port for measuring total reflection (diffuse plus specular) and reflection of the diffuse component only. For both spheres, the selection of light illumination onto the sample or onto the reference surface is done via a flipper mirror. This allows the background to be collected using either the substitution method or the Taylor method.

Gold-coated Lambertian finish sphere.

SPECIFICATIONS

Optical Design	Upward- or downward-looking sample spheres
Angle of Incidence	12 degrees
Sphere Diameter and Surface	76.2 mm (3″) gold-coated Lambertian surface
Sample Port Size	20 mm
Specular Exclusion Port	Standard
Sphere Dimensions (W x D x H)	159 x 248 x 154 mm (excludes baseplate)
Sample Opening, Downward Sphere	50.8 x 35.5 x 12.7 mm
Spectral Range, MCT Detectors	Wide-band: 5000–500 cm^{-1} Mid-band: 5000–650 cm^{-1} Narrow-band: 5000–800 cm^{-1}
InGaAs Detector	12,200–3850 cm^{-1}

UPWARD-LOOKING MID-IR INTEGRATIR

For the upward-looking sphere, reflectance samples are placed directly onto the sample port located on the top of the sphere. This sphere is ideal for large and/or thick solid samples. For powders, a ZnSe window plate is available. If preferred, a KBr window can also be used with the sample plate to minimize the reflection loss compared to ZnSe.

DOWNWARD-LOOKING MID-IR INTEGRATIR

The downward-looking Mid-IR IntegratIR allows the sample to be placed underneath the sphere. This configuration is desirable for measurements of powders and particulate materials because the incidence beam strikes the sample directly, without passing through an IR transparent window.

DIFFUSE TRANSMITTANCE MEASUREMENTS

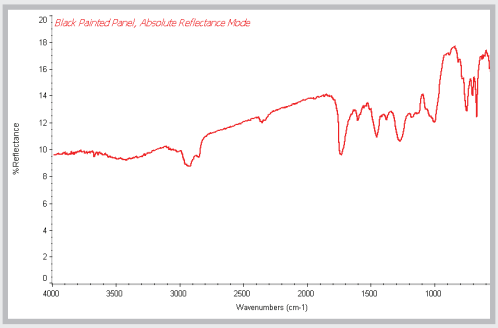
Diffuse transmittance of partially transmitting materials can be measured with both spheres. This is done by placing the sample on a standard 2 x 3″ sample holder and sliding it in the mount located in the incoming beam port.

DETECTOR OPTIONS

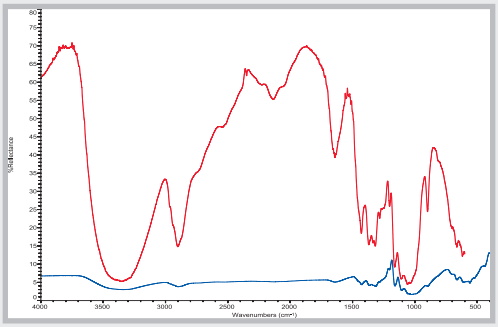
A selection of mercury cadmium telluride (MCT) or deuterated triglycine sulfate (DTGS) detectors is offered with the IntegratIR spheres. The wide-band MCT is the commonly configured detector while the less sensitive DTGS is an option for users who require the convenience of a room temperature detector. The MCT detector is approximately 50 times more sensitive compared to the DTGS detector. All detectors are interchangeable. For those FTIR spectrometers with near-IR spectral capabilities, a sensitive InGaAs detector is available.

APPLICATION

An integrating sphere is ideal for measuring reflectance and transmittance of diffusely scattering material, as the accessory enables the hemispherical collection of scattered IR beam caused by the sample.



Absolute reflectance spectrum of a painted black panel measured using the Mid-IR IntegratIR.

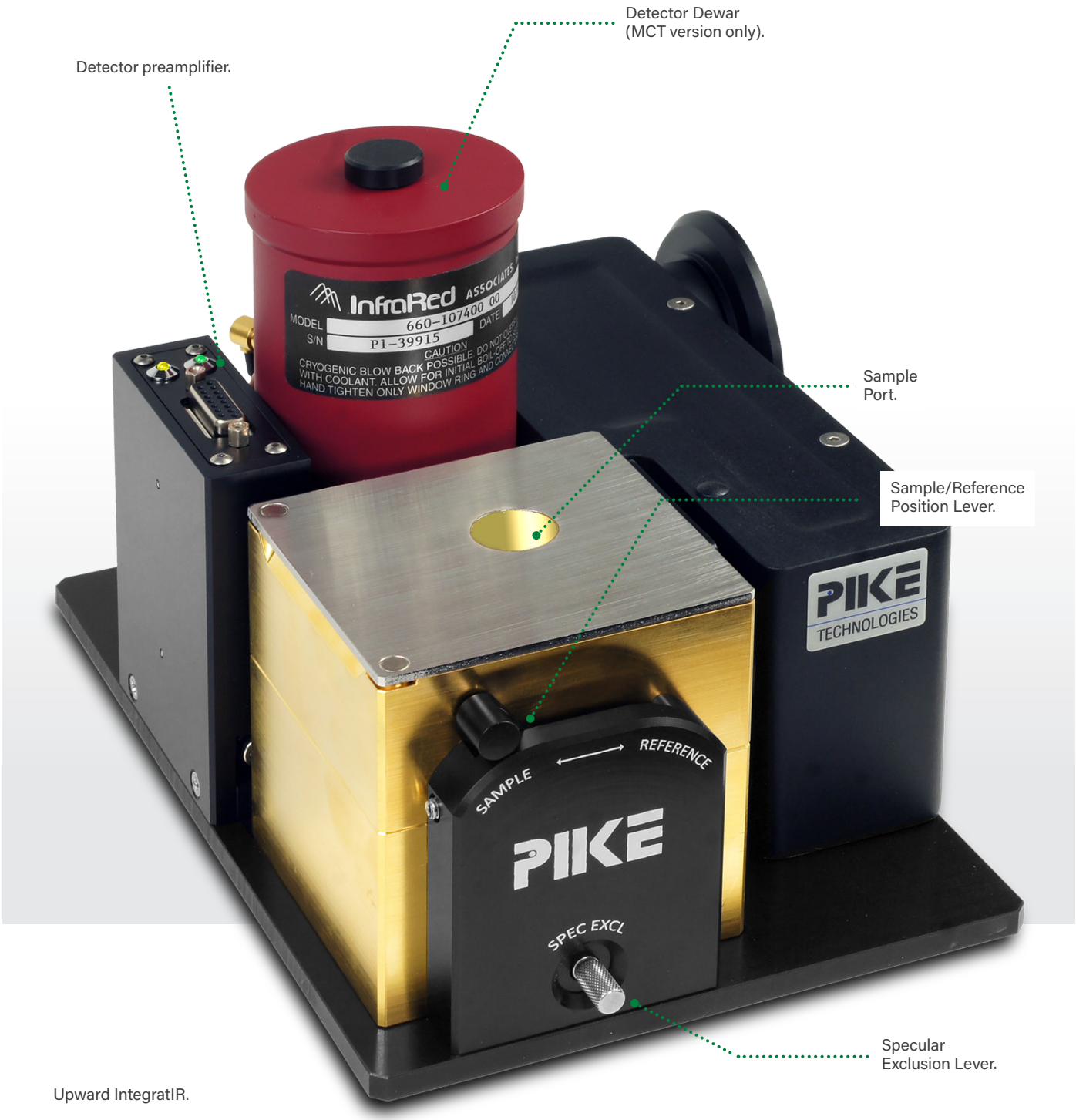


Comparison of transmittance spectra of diffusely scattering paper collected using an IntegratIR (red) versus without a sphere (blue).

Downward-looking IntegratIR.

PART NUMBER	DESCRIPTION
048-12XX	Upward Mid-IR IntegratIR Integrating Sphere Includes sphere, purge enclosure and tubing, diffuse gold reference and sample plate with ZnSe window
048-11XX	Downward Mid-IR IntegratIR Integrating Sphere Includes sphere, purge enclosure and tubing, one diffuse gold reference and powder sample cup
	Notes: replace XX with your spectrometer's Instrument Code listed in the back of the catalog. Your FTIR spectrometer must be capable of interfacing with an external detector.
	Detector Choice for IntegratIR *(must select one)*
048-3350	Wide-band MCT Detector
048-3250	Mid-band MCT Detector
048-3150	Narrow-band MCT Detector
048-3550	InGaAs Detector
	Notes: Detector includes preamplifier electronics. MCT detectors require liquid nitrogen for cooling.

PART NUMBER	DESCRIPTION
	Replacement Parts and Sampling Options
048-0108	Sample Plate with 20 x 2 mm ZnSe Window for Upward IntegratIR
048-0208	Sample Plate with 20 x 2 mm KBr Window for Upward IntegratIR
048-3000	Diffuse Gold Reference for Upward IntegratIR
048-3001	Diffuse Gold Reference for Downward IntegratIR
048-2020	Powder Sample Cup for Downward IntegratIR



Upward IntegratIR.