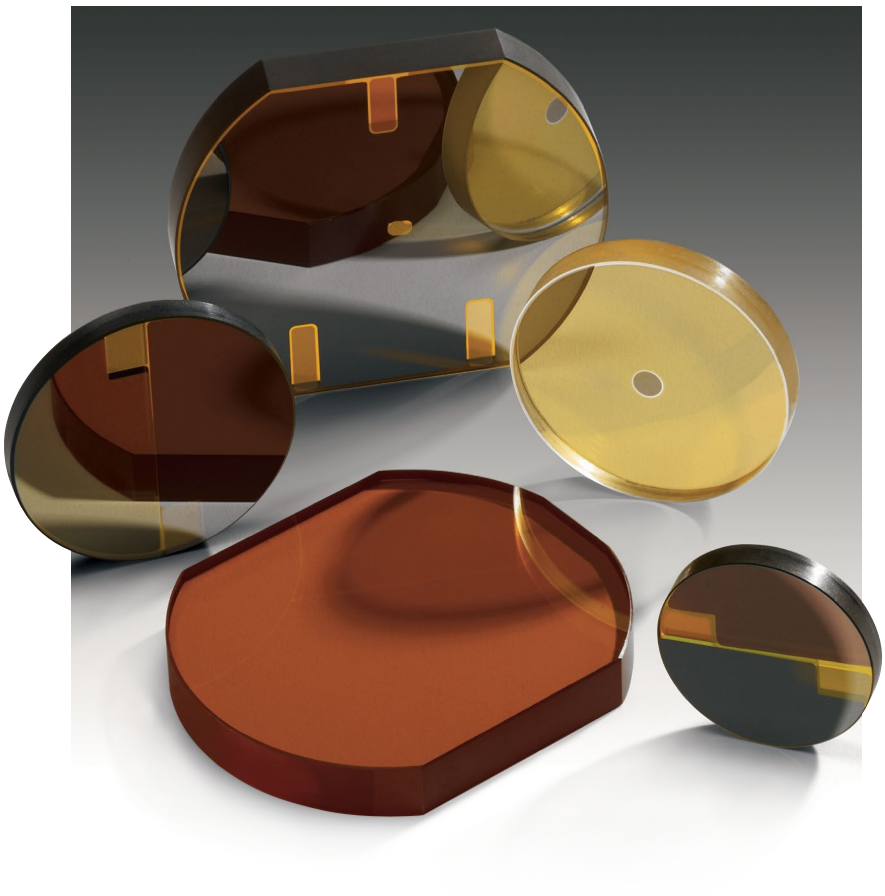
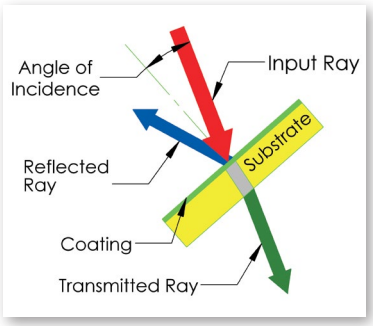
INFRARED BEAMSPLITTERS

Optimized Transmission and Reflection of the Infrared Beam

- Full product offerings from vacuum UV to the far-IR
- Highest performance designs for each spectral region
- Highest quality components and coatings to eliminate undesirable spectral features
- Available design and manufacturing service to customize your applications





Reflected and transmitted rays from the infrared beamsplitter

Spectral Systems is the world's leading supplier of FT-IR beamsplitter components and sub-assemblies. We provide the market with a full range of optical components, standard coatings and engineering support for new designs and can contribute our technical knowledge toward the development of your instrument. Our beamsplitters are used in instruments produced to compete in the markets of hazardous materials, environmental control, process control and material recognition on the manufacturing floor. Spectral Systems possess vast knowledge of the critical parameters of beamsplitter design and manufacture. We are capable of taking a beamsplitter design and making improvements desirable for your unique application. Our knowledge of infrared materials purity, flatness requirements, angular tolerances, matching of compensators and the phase and amplitude response when compensated and the critical completing features of our specialty coatings all will complement your design. Spectral Systems Photon Pro™ infrared beamsplitters are the culmination of our experience and knowledge providing the finest quality product in the industry.

Generally the infrared beamsplitter is designed to simultaneously transmit and reflect 50% of the incident beam between two optical elements. In the case of an interferometer within a FT-IR, the optical elements are represented by a fixed and a moving mirror. The design of the beamsplitter must take into account many factors including dimensions, desired substrate and spectral range, incident beam angle and requirements for durability.

Research and development services are available through our process engineering staff to solve some of the more common problems such as fringing, chirping and insufficiently broad spectral coverage necessary in the mid-IR to far-IR spectral regions.

SPECIFICATIONS

Materials	KBr, CsI, CaF_2, Infrasil™, BK-7, ZnSe, Mylar, Si
Extreme Flatness	KBr, CaF_2, Infrasil, BK-7, ZnSe: λ/20 P.V. at 633 nm
	CsI: λ/10 P.V. at 633 nm
	Si: λ/8 P.V. at 633 nm
	Mylar: 5λ P.V. at 633 nm
Extreme Parallelism	±0.1 arc seconds (most materials)
Wedge Applications	±2 arc seconds (as required)
Coatings	Visible: 350–800 nm, 50/50%, ±15% T/R
	Near-IR: 1000–5000 nm, 50/50%, ±15% T/R
	Mid-IR: 5000–25000 nm, 50/50%, ±20% T/R
	Far-IR: 10000–50000 nm, 50/50%, ±35% T/R

Most of our beamsplitter designs have flat response through their spectral coverage. This ensures that the beamsplitter does not contribute to overall instrument instability.

Our long history and experience in the design and manufacture of infrared beamsplitters allows us to provide the highest level of support and service to you. Our beamsplitters are used in handheld spectrometers, laboratory FT-IRs, military interferometers, dedicated analysis instruments and high resolution spectrometers worldwide. Most of the beamsplitters we manufacture are proprietary designs for our customers. Within these pages we list generic versions of infrared beamsplitters available from Spectral Systems. Please contact us to discuss your beamsplitter requirements.

ORDERING INFORMATION

Photon Pro CaF_2 Beamsplitters

DESCRIPTION	PART NO.
25 × 2 mm, 0.6–8.0 µm	920-3516H
32 × 3 mm, 0.8–9.0 µm	920-3716H
50 × 6 mm, 0.6–8.0 µm	920-0506H
57.15 × 6 mm, 0.8–9.0 µm	920-5716H

Photon Pro KBr Beamsplitters

DESCRIPTION	PART NO.
25 × 2 mm, 2–28 µm	945-3516H
32 × 3 mm, 1–25 µm	945-3716H
50 × 6 mm, 2–28 µm	945-0506H
57.15 × 6 mm, 2–28 µm	945-5716H
57.15 × 8 mm, 1–25 µm	945-5718H
69.85 × 8 mm, 1–25 µm	945-6908H
72 × 10 mm, 2–28 µm	945-7210H

Photon Pro ZnSe Beamsplitters

DESCRIPTION	PART NO.
25 × 2 mm, 2–20 µm	975-3516H
30 × 3 mm, 7–14 µm	975-0303H
32 × 3 mm, 7–14 µm	975-3716H
50 × 3 mm, 2–20 µm	975-4116H
69.85 × 8 mm, 2–20 µm	975-6985H

Broad list of applications we cover with our beamsplitters

Mid-IR Commercial

For commercial applications with FT-IR spectrometers, the substrate of choice has always been KBr. This choice has defined the long wavelength limit (25 µm) for the specification of the spectrometers and they cover at least the range of fundamental vibrations of molecules, usually to 2.5 µm. These fundamental vibrations are usually strongly absorbing and specific to the molecular structure. Therefore, commercial applications are often identifications and/or detection of molecular species. Even though the spectrometers are commonly used in a "pseudo" ratio mode, it is desirable, if not essential to minimize the spectral structure on the beamsplitter performance while achieving the near 50% beam splitting for optimum sensitivity. Therefore the beamsplitter should be maximally flat, non-absorbing and broad band at 50% transmission/reflection.

Mid-IR Military, Environmental

The spectral performance of FT-IR systems for military and environmental applications is determined by the location of the atmospheric transmission windows of 3–5 µm, traditionally called mid-IR and the 8–12 µm window called the far-IR. Military and environmental applications generally require a more durable substrate than KBr and CaF_2 and anti-reflective (AR) coated ZnSe substrates are generally specified for the mid-IR region. As in the commercial applications, sensitivity is important and the beamsplitters for this application should be about 50% transmission/reflection over this region.

Near-IR Commercial

Most near-IR commercial applications involve quantification by measuring the overtone and combination bands of the fundamental vibrations found in the mid-IR. Since these bands are much weaker than the fundamental vibrations, sample preparation becomes easier and accurate quantification is possible. It becomes very important to minimize spectral features in the spectrometer. As a result CaF_2 substrates are often preferred since they have none of the adsorbed OH impurities found in all SiO_2/quartz substrates.

Far-IR Commercial

The fundamental vibrations of many molecules can occur at wavelengths beyond the limit of KBr transmission. Analysis, identification and detection of many compounds such as organometallics and polymers can optimally be done at longer wavelengths. In addition, if extended to sufficiently long wavelengths, FT-IR/far-IR can overlap the exciting new Terahertz spectroscopy systems. CsI can be used to extend the spectrometer range to 50 µm. However, beyond that range either uncoated Si substrates or coated pellicles of Mylar or other non-absorbing polymers are used.

Far-IR Military, Environmental

For requirements of durability beamsplitter substrates of AR coated ZnSe

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PRECISION IN OPTICS

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