

enabling your ideas.

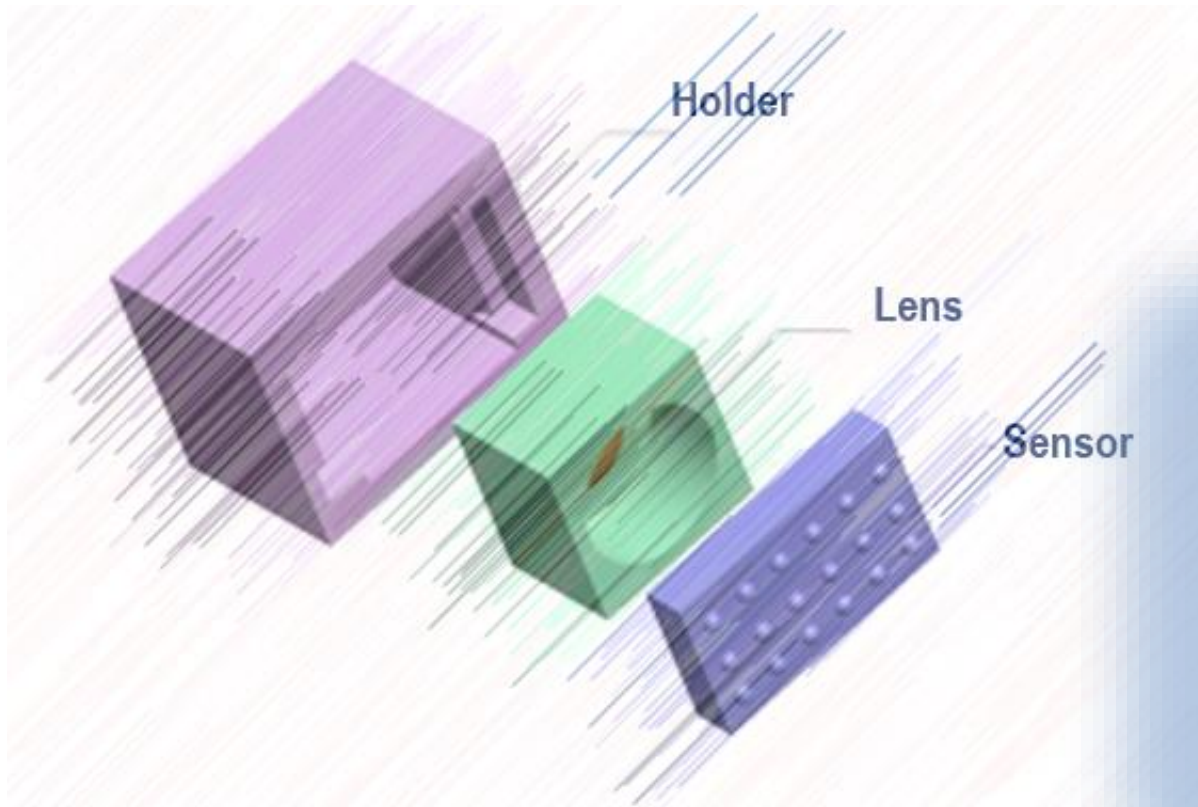
Optical, Power and Thermal Management Technologies

Mid-IR Optics, Technologies and Advantages

EPIC online Technology meeting on Mid-IR Photonics May 13th. 2020

Thomas Moritz, AMS Technologies AG www.amstechnologies.com

...every camera needs an optics



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Glass types

BD6 GLASS DATASHEET

Advantages of LightPath's BD6 Chalcogenide Glass

- High Transmission over 1-14µm Band
- Low Weight (13% lower than Ge)
- Optical Athermalization with low dn/dT (13 times lower than Ge)
- Can be diamond-turned, polished or molded (scales to high volume)
- No Germanium Content

BD6 chalcogenide glass is ideal for use in MWIR and LWIR thermal imaging systems. Our team of experienced engineers will work with you to design lenses for your application.



Optical Properties

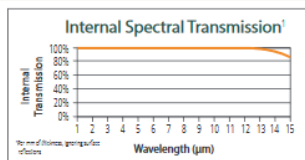
| Refractive Indices and Absorption Coefficient | | |
|---|------------------|--|
| Wavelength λ (µm) | Refractive Index | Absorption Coefficient (cm ⁻¹) |
| 2 | 2.6230 | 0.003 |
| 4 | 2.7978 | 0.002 |
| 6 | 2.7914 | 0.002 |
| 8 | 2.7867 | 0.002 |
| 10 | 2.7816 | 0.003 |
| 12 | 2.7755 | 0.004 |
| 14 | 2.7683 | 0.068 |

Internal Transmission Formula

$T = e^{-\alpha d}$
Where α is the absorption coefficient, and d is the sample thickness

Coatings

HEAR and DLC coatings available



Other Properties

| Mechanical Properties | |
|-----------------------|------------------------|
| Density | 4.63 g/cm ³ |
| Hardness (Vickers) | 142 HV |
| Young's Modulus | 19.8 GPa |

| Thermal Properties | |
|------------------------|-----------------------------|
| Max. Exposure Temp | 110°C |
| CTE (25-100°C) | 22.5 x 10 ⁻⁶ /°C |
| dn/dT @ 10 µm (0-40°C) | 30.5 x 10 ⁻⁶ /°C |

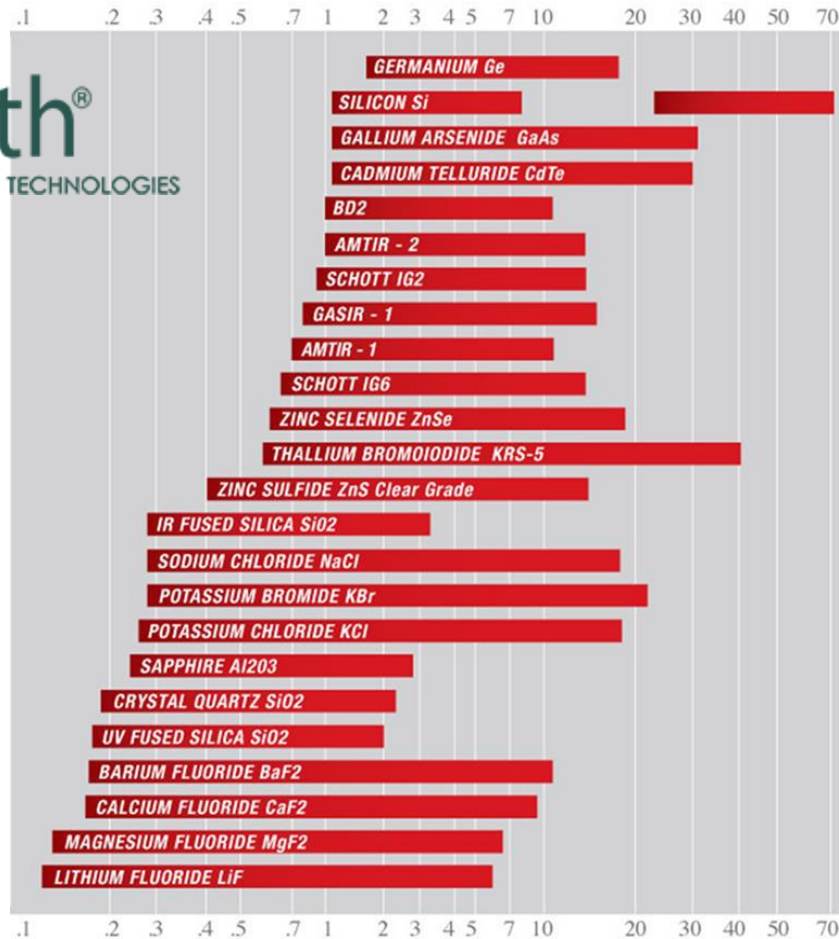
| Equivalent Glass Types | |
|------------------------|--------|
| Brand | Name |
| Schott | IRG 26 |
| Viton | IG6 |

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A LightPath[®] COMPANY

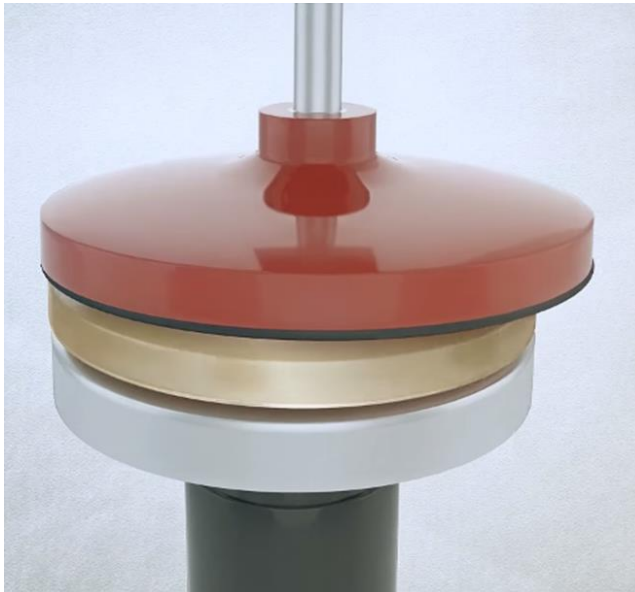


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Conventional lens technology

Spindel polishing



Diamond turning



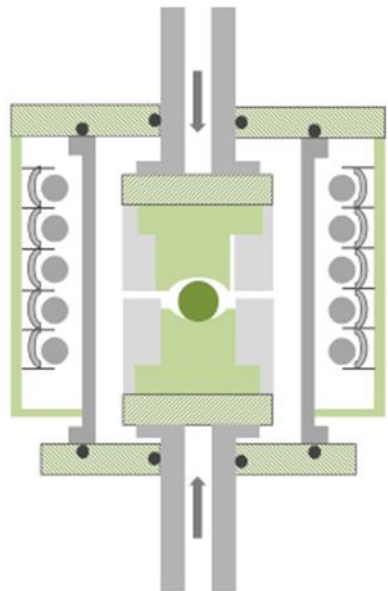
CNC polishing



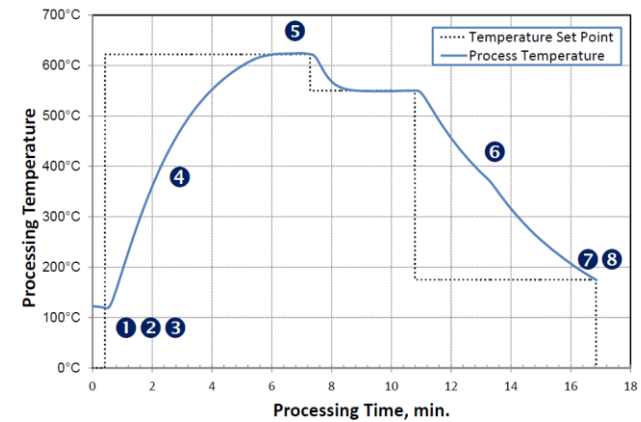
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Lens Molding



- High volume manufacturing process
- High temperature compression molding
- Precision tooling
- Controlled Environment
- Precision Components



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Best of two technologies: Hybrids

LightPath Thermal Imaging Lens Assemblies

| Part Number | Material | Effective Focal Length | F# | Recommended Detector Format (H x V Resolution / Pixel Size) | Horizontal FOV (on Specific Detector) |
|-------------|-------------------------|------------------------|-----|---|---------------------------------------|
| 7100333 | Molded BD6™ | 1.5 mm | 1.3 | 80 x 80 / 34 μm | 120° |
| 7100327 | Molded BD6™ | 1.9 mm | 1.3 | 80 x 80 / 34 μm | 90° |
| 7100380 | Molded BD6™ | 2.7 mm | 1.3 | 80 x 80 / 34 μm | 60° |
| 7100331 | Molded BD6™ | 5.3 mm | 1.3 | 320 x 240 / 12 μm | 42° |
| 7100306 | Molded BD6™ | 6.3 mm | 1.3 | 320 x 240 / 17 μm | 50° |
| 7100305 | Molded BD6™ | 7.7 mm | 1.3 | 320 x 240 / 17 μm | 41° |
| 7100320 | Molded BD6™ | 9 mm | 1.3 | 320 x 240 / 17 μm | 35° |
| 7100340 | Molded BD6™ | 15 mm | 1.2 | 640 x 512 / 10 μm | 25° |
| 7100350 | Molded BD6™ | 15 mm | 1.0 | 384 x 288 / 17 μm | 25° |
| 7100338 | Molded BD6™ | 19 mm | 1.1 | 640 x 480 / 17 μm | 32° |
| 7100341 | Molded BD6™ | 20 mm | 1.2 | 640 x 512 / 10 μm | 18° |
| 7100346 | Molded BD6™ | 24 mm | 1.2 | 640 x 480 / 17 μm | 26° |
| 7100369 | DT Crystalline | 25 mm | 1.0 | 640 x 480 / 17 μm | 25° |
| 7100383 | DT / Molded BD6™ Hybrid | 35 mm | 1.0 | 640 x 480 / 17 μm | 18° |
| 7100353 | DT / Molded BD6™ Hybrid | 50 mm | 1.2 | 640 x 480 / 17 μm | 12° |




Featuring
ISP
OF THERMAL
A LightPath COMPANY

LightPath®
TECHNOLOGIES

LightPath Technologies

7100346 1000081 24mm f/1.2

- New 35mm DT / Molded BD6™ Hybrid
Part # - 7100383
- New 50mm DT / Molded BD6™ Hybrid
Part # - 7100353



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we are unique

our solution approach



AMS Technologies is the only provider of custom products and solutions with interdisciplinary competencies across Photonics, Thermal Management and Power Technologies. Our Mission is to facilitate innovative companies to convert these technologies into an asset for success.

Established 1982
>100 employees
€ 30+ million turnover
7 offices across Europe

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