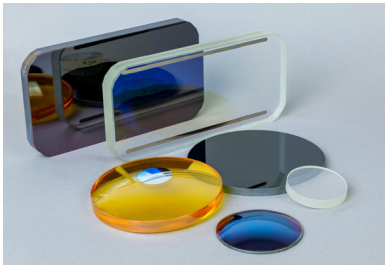
Frontal Optics for Ultimate Applications

IR optics widely used when the tasks like the following are arisen:

- Early and fast detection of the people, targets, forest fires, etc.;
- Day and night panoramic surveillance;
- Security perimeters control;
- Range and visual tracking;
- Coastal and border passive surveillance;
- Traffic monitoring;
- Detection of intrusion, fight against piracy, antismuggling, anti-collision and many others.



The challengings of these applications dictate special requirements both to a substrate's mater l and to a coating since just the frontal elements face the most severe service conditions.

Any optical assembling here must not only clearly "see" and distinguish an target/object, but minimize the posibility of its own detection.

Below we emphasize the basic requirements to the materials and coatings:

- for brightness and image contra ts the internal light scattering the IR materials has to be not more than few percents. For more details please look at the chapter "Germanium Windows and Lenses for Thermography". At the same time the maximal directional transmission for monocrystalline Ge should exceed 40% (when the integral one = 46%) and for monocrystalline Si should exceed 48% (when the integral one = 54%);

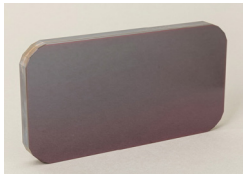
- to the said above, to guarantee the high optical transmission the coatings should have minimal residual reflection (a few percent for a narrow) over the working range including the cases when at the same time transmission within both atmospheric optical windows (3-5µm and 7-14µm) is required;

- to guarantee high enough reliabilty, durability and failurefree performance the coatings must meet the requirements of the optical-mechanical, adhesion, climatic and others tests: Russian OST3-1901-95, MIL-C-675C, MIL-STD-810

Hereunder are some examples of the optical elements demonstrating the range of our products with brief information about application. Additional information is available in the chapter "Optics for Sensors and Detectors".

1. Si protection window for a night-sight operating at 3-5µm range

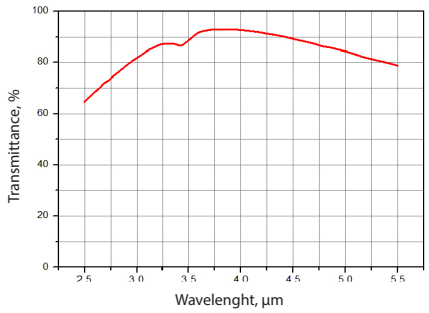
Generally used as a front window transmitting over the working range to protect an optical assembling of IR night vision system. Detection range is 10km.



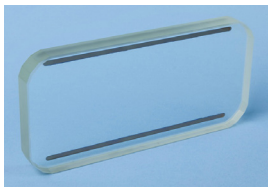
In combination with a window for a visible channel (for a daylight inspection - see below #2) such night- sights are placed at some military-oriented vehicles.

Specification:

Part type	Plano-plano window
Material	Si
Overall dimensions, mm	218.0 (-0.3/-0.5) x 119.0 (-0.3/-0.5)
Thickness, mm	16.0 (+/-0.2)
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=1.5, deltaN<=0.3 @ 633 nm
Wedge, arc. min.	< 1
AR coating (DLC/DLC type) @ 3-5um	See the curve attached



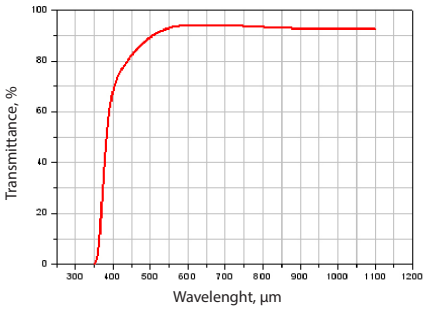
2. Radiation-resistant glass K108 window for a night-sight



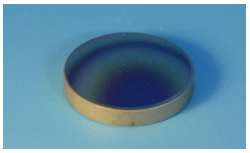
Application: see above #1. This window is placed near the abovementioned Si window and operate in the day-time. Combination of AR coating outside and coating from inside allows to minim ze residual reflection and prevent ice accretion, snow ticking and to conduce of water/hoar/ice removal. As a result a window effectively works at three working wavelength ranges.

Specification:

Part type	Plano-plano window
Material	Radiation-resistant glass K108
Overall dimensions, mm	228.0 (-0.3/-0.5) x 109.0 (-0.3/-0.5)
Thickness, mm	20.0 (+/-0.5)
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=2, deltaN<=0.2 @ 633nm
Wedge, arc. min.	< 1
AR coating (AR/ITO type) @ 430-680nm, 870-920nm and 1060nm	See the curve attached



3. Ge meniscus lens of thermal vision system for targetseeking and orientation



Application: on-board equipment. Working wavelengths range - 3-5µm. Working angles range - 0-57 degrees.

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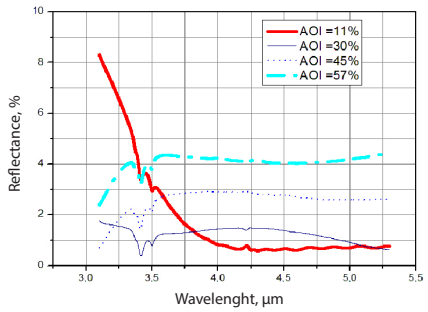
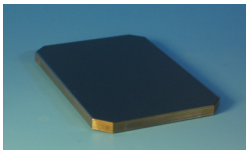
Specification:

Part type	Meniscus lens
Material	Ge
Diameter, mm	36.0 (-0.05/-0.08)
Central thickness, mm	2.4 (+/-0.1)
EFL tolerance, %	+/- 2
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=2, deltaN<=0.2 @ 633nm
AR coating (BBAR/BBAR) @ 3.6-4.8µm	See the curve attached



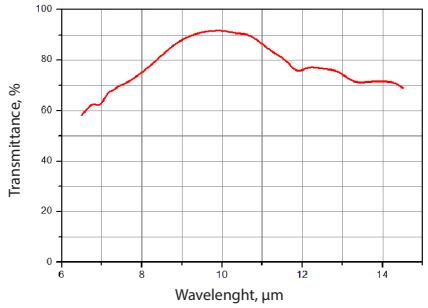
4. Ge protection window for a night-sight operati at 8-12 µm range

Application: periscopic night-sight for the armoured vehicles. Detection range (the target like a tank) is 3km.



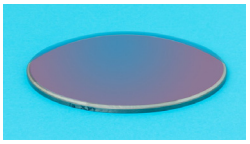
Specification:

Part type	Plano-plano window
Material	Ge
Overall dimensions, mm	156.0 (+0/-0.2) x 130.0 (+0/-0.2)
Thickness, mm	10.0 (+/-0.1)
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=5, deltaN<=0.5 @ 633nm
AR coating (DLC/DLC type) @ 8-12µm	See the curve attached



5. Ge protection meniscus lens for infrared imaging camera operating at 7-14µm

Application - passive surveillance system of long-distance targets as well as large area monitoring in real time regime. The feature of the system is automatic detection and target's tracking.

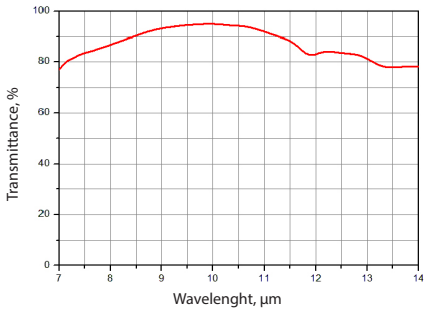


Vehicle detection range is 7km.

Human detection range is 3km.

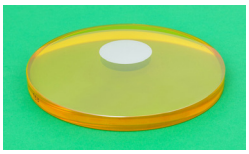
Specification:

Part type	Meniscus lens
Material	Ge
Diameter, mm	154 (-0.145/-0.245)
Central thickness, mm	11.0 (+/-0.1)
EFL tolerance, %	+/-2
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=10, deltaN<=2 @ 633 nm
AR coating (DLC/BBAR type) @ 7-14µm	See the curve attached



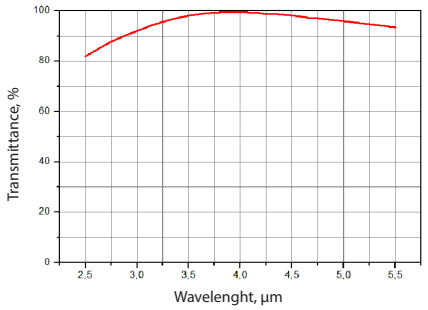
6. ZnSe protecti meniscus lens for a land-based thermal vision system

Application - monitoring, seeking and tracking of various flying objects.



Specification:

Part type	Meniscus lens
Material	CVD-ZnSe
Diameter, mm	130.0 (-0.043/-0.143)
Central thickness, mm	12.1 (+/-0.02)
EFL tolerance, %	+/- 2
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=2, deltaN<=0.2 @ 633nm (deltaN<=0.1 in central area of D33.5 mm)
AR coating (BBAR/BBAR) @ 3-5um as well as for 550nm	see the curve attached



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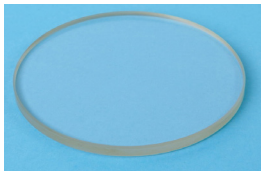
7. Sapphire window for infrared imaging camera operating at 3-5µm range



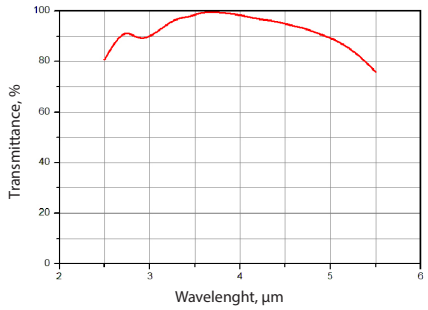
Application the most demanding and severe working conditions when an application dictates the exaggerated requirements to durability of the material, its chemical stability, nontoxicity and so on.

We have been suppling similar windows for:

- the systems to measure temperature profile and speeds of the liquid's flow;
- protection of the objectives during high pressure experiments as well as at dynamic impacts;
- observation of the processes into the wind-tunnels.

Specification:

Part type	**Plano-plano window**
Material	Optical grade sapphire
Diameter, mm	150.0 (+0/-0.2)
Thickness, mm	10.0 (+/-0.2)
Surface quality, scr/dig	60/40
Surface figure, fringes	N<=2, deltaN<=0.5 @ 633 nm deltaN<=0.5 @ 633nm
AR coating (BBAR/BBAR) @ 3-5µm	see the curve attached



Tydex has long-time and approved exper ence in suppling of such optics for above-mentioned applications all over world.

We are pleased to emphasize that the list of similar components is permanently replenished and we are ready to consider your new RFQ's.

For price quotation and delivery please fill in our request form.

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