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About us

Scientific-technical firm IZOVAC is a well-known brand name amidst manufacturers of vacuum sputtering equipment in CIS. Fundamentals of this production were laid down first in one of research laboratories of the Belarussian State University of Informatics and Radioelectronics, where excellent teams of experts in the field of equipment and technology of thin-film coatings, physics of surface, plasma and ion beams were set up, and for the last twenty three years they have been intensively developed by the company itself.

Innovations in the field of new film technologies, manufacturing of state-of-the-art optical elements and production of unique vacuum equipment, sputtering techniques and relative software is the principal activity of the company.

Thus, company’s business activity is aiming at satisfying demands of manufacturers of variety industries for exclusive vacuum technologies and thin-film products, giving our customers undoubted competitive edge. Our Customers are Companies from

Capabilities

- Development of optical coatings

  Due to long experience in the calculation and designing of optical coatings, as well as the use of advanced calculation programs and optical control during the deposition of coatings, our specialists will help you find the best solution for your problems.

- Optical coatings service

  Izovac has the ability to apply a wide range of optical coatings on the Customer's requests.

  Among the possible optical coatings, one can mention antireflection, beam splitting, semitransparent, reflective coatings, optical diamond coatings, optical coatings in the ultraviolet, visible and infrared wavelengths range.

  The following technologies: ion-beam and magnetron sputtering method, an electron-beam evaporation and direct ion beam deposition are used for up-to-date coatings application. For optical coatings charachteristics improvement the ion-beam cleaning and ion-beam assisting technology are used.

  Large base of own-made modern vacuum coating equipment allows us to propose for our clients wide-range of quality thin film coatings in short terms.
- **Optical components production**

Izovac can supply optical elements with thin-film coatings in according to customer's drawings. Company's manufacturing capabilities include the manufacture of narrowband and broadband filters, optical mirrors, beam splitters, optics for UV, VIS and IR ranges.

Depending on the complexity of coating, the technical possibilities of the spectral characteristics of the coatings are in the range from 260 nm to 5 microns.

- **Competent personnel - Department of Advanced thin-film technologies**

A team of qualified engineers, possessing extensive knowledge and experience in the manufacturing of thin-film products, will help to select the most appropriate solution to your problems.

- **Research work on sputtering optical coatings technologies**

Izovac pays great attention to scientific-research work. Department of Advanced Technologies continually enriches base of well-tested optical coatings.

We are glad to assist our customers to find or develop a new optical coating on the set of output parameters.

In addition to developing of a structure of optical coatings, we can develop the technology and vacuum coating equipment for its realization, which will be established taking into account all your requirements in order to achieve the highest quality and complete solutions to your problems.

A trial batch of a few pieces could be made at short notice to conduct experimental tests of a Customer.
Anti-reflection coatings

Izovac Company offers optical antireflection coatings. It is possible to coat Customer’s details, as well as to produce a whole optical element coated with anti-reflective coating on the customer's request. IZOVAC offers not only one wavelength antireflection coatings, but also broadband antireflection coating on the desired wavelength range.

In addition to standard anti-reflective coating, Izovac Company is able to offer diamond-like optical coatings on silicon and germanium substrates, which in addition to increasing the transmittance significantly increases the mechanical strength of the product.

1. One-wavelength anti-reflection coatings

Anti-reflection coating for $\lambda = 1064$ nm;
$R \leq 0.05 \%$ for $\lambda = 1064$ nm;
Substrates: Glass, Quartz, Sapphire, YAG and other.;

Anti-reflection coating for $\lambda = 1540$ nm;
Working angle of incidence 0-30°;
$\alpha (0^\circ), R \leq 0.1 \%$ for $\lambda = 1540$ nm;
$\alpha (30^\circ), R \leq 0.2 \%$ for $\lambda = 1540$ nm;
Substrates: Glass, Quartz, Sapphire, YAG, Si and other.;

2. Multiline and broadband anti-reflection coatings

Anti-reflection coating for 3 wavelength:
$\lambda = 355, 532, 1064$ nm;
$R \leq 0.05 \%$ for $\lambda = 355$ nm, $\lambda = 532$ nm, $\lambda = 1064$ nm;
Substrates: Glass, Quartz, Sapphire, YAG and other.;

Anti-reflection coatings for visible spectrum range;
$R_{int} \leq 0.3 \%$ for 400 – 700 nm;
Substrates: Glass, Quartz, Sapphire, YAG and other;
High reflection coatings

Optical mirrors are designed to reflect a given wavelength or range of wavelengths. Properly chosen structure of optical coatings allows obtaining optical mirrors with a maximum value of the reflection coefficient, and optical mirrors with high laser resistance and durability.

1. One-wave and multiline mirrors

- High-reflectance coating for one wavelength $\lambda = 1064$ nm; $R \geq 99.9\%$ for $\lambda = 1064$ nm; Substrates: Glass, Quartz, Sapphire, YAG and other.
- High-reflectance coating for two wavelengths $\lambda = 532, 1064$ nm; $R \geq 99.5\%$ for $\lambda = 532, 1064$ nm; Substrates: Glass, Quartz, Sapphire, YAG and other.

2. Broadband mirrors

- High-reflection coatings for visible spectrum range; $R \geq 98\%$ for $\lambda = (400 - 700)$ nm; Substrate: Glass, Quartz, Sapphire, YAG and other.
- Metal high-reflection coatings for visible spectrum range; $R \geq 90\%$ for $\lambda = (400 - 700)$ nm; Substrate: Glass, Quartz, Sapphire, YAG and other.
Beamsplitter coatings

Beamsplitter – optical element, that splits incident light by a specified ratio. Izovac produce beamsplitters on the technical requirements of the customer.

1. Non-polarizing beamsplitters

![Graph showing HR for λ = 532 nm and HT for λ = 1064 nm. The coating splits light 50/50 in 400–800 nm range. Tint = 50% for 400–800 nm range. Substrate: Glass, Quartz, Sapphire, and other.]

HR for λ = 532 nm and HT for λ = 1064 nm, Angle of incidence: α = 45°;
R ≥ 99% for λ = 532 nm, R ≤ 0.5 % for λ = 1064 nm;
Substrate: Glass, Quartz, Sapphire, YAG and other.;

2. Polarizing beamsplitters

![Graph showing HT (Tp polarization) and HR (Ts polarization). Angle of incidence α = 45°; Tint p ≥ 98 %, Tint s ≤ 1 % for λ = 1000 - 2000 nm; Substrate: Glass.]

HT (Tp polarization) and HR (Ts polarization), Angle of incidence α = 45°;
Tint p ≥ 98 %, Tint s ≤ 1 % for λ = 1000 - 2000 nm;
Substrate: Glass;

![Graph showing λ = 1064: Tp ≥ 99.5%, Ts ≤ 0.5%.]

λ = 1064: Tp ≥ 99.5%, Ts ≤ 0.5%;
Tint p ≥ 99.5 %, Tint s ≤ 0.5 % for λ = 1064 nm;
Substrate: Glass, Quartz, Sapphire, and other.;
Filter coatings

Optical Filters are used to selectively pass or block a specific wavelength or wavelength range. Optical filters are used in a lot of applications: from laboratory and analytical equipment to remote sensing of the earth from space.

"IZOVAC Technology" provides a unique opportunity of the production of optical filters on the technical requirements of the customer. Our specialists will be glad to help with the selection of optimal coverage that meets your specifications. Our technical capabilities allow you to produce a wide range of optical filters for infrared, visible and ultraviolet range.

1. **Bandpass filters**

   ![Filter 532 nm](image1)
   ![Filter 1576 nm](image2)

   Central Wavelength 532 nm; Bandwidth 10 nm; Blocking range is forming with the help of color glass substrates and coatings. Substrate: Glass, Color glass, Quartz, Sapphire, and others.

   Central Wavelength 1576 nm; Bandwidth 30 nm; Blocking Wavelength Range: UV - 1850 nm; Tint ≤ 0.1 %; Substrate: Si.

2. **Broad bandpass filters**

   ![IR filter](image3)
   ![Cold mirror](image4)

<table>
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<th>Parameter</th>
<th>Data</th>
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<tr>
<td>Δλ0.5</td>
<td>400 - 690 nm</td>
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<td>Blocking</td>
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<td>T_{int}(400-700 nm)</td>
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<td>T_{int}(740-1150 nm)</td>
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<table>
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<tr>
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<tbody>
<tr>
<td>Δλ0.5</td>
<td>700 nm</td>
</tr>
<tr>
<td>Blocking</td>
<td>400 - 690 nm</td>
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<td>T_{int}(710-1000 nm)</td>
<td>92 %</td>
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<tr>
<td>T_{int}(400-690 nm)</td>
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Multiband precision filters

Currently, multiband bandpass filters are widely used in space industry. They significantly improve the image contrast and allow separating spectral ranges, to allocate spectrum bands for information by remote sensing. Using multispectral filters on a single substrate greatly simplifies the optical schemes of devices and significantly reduces the cost of optical systems, which allows using such systems on commercial satellites as well.

"IZOVAC Technology" has successfully developed the technology of manufacturing multiband optical filters on a single substrate. This approach makes it possible to vary the geometry and spectral ranges filters on demand and create opaque areas between filters. Products are used as the input window of CCD matrix.

Izovac has technical facilities for manufacturing different types of stated filters in accordance with Customer's requirements.

Ex 1. 4 spectral zone: 450-520 nm, 520-600 nm, 620-700 nm, 760-900 nm. Size 10x15x1mm.

Ex 2. 3 spectral zone 450-520 nm, 670-700 nm and 700-730 nm. Size: 7x20x1,65 mm.
DLC – coatings

Izovac company has developed and successfully uses the efficient method of forming diamond-like protective optical antirefection coatings (DLC-coatings) on germanium and silicon substrates. Such optical coatings sufficiently increase mechanical strength of the products as well as transmission coefficient. The method is based on sputtering graphite targets and destruction of hydrocarbons in gas discharge plasma with subsequent ion beam formation, resulting in formation of quazi-amorphous diamond-like films. The method allows to change energy of condensing particles in the range of 20-60 eV under control.

Presently diamond-like coatings are custom-deposited on germanium and silicon substrates with maximum dimensions 360×340 mm with guaranteed coating uniformity ±3%. To provide deposition thickness uniformity the source is made elongated with output aperture length about 500 mm. Own designed and built vacuum coating system “Diamanta” is used for diamond-like carbon coatings application.

Germanium optics parts with deposited coatings have passed all environmental tests and optical mechanical evaluations, established for coatings of such class. A special set of tests of germanium optics parts was also conducted by Thomson company (France) using IR-chamber Catherine. Judging by results of tests diamond-like coatings from Izovac Company meet all international requirements set for the articles of this type.

Main characteristics of DLC coating:
- Hardness;
- Wear resistance;
- Chemical resistance;
- Climatic resistance;
- Stability;
- High adhesion to the surface of germanium and silicon;
- Broadband antirefection for germanium and silicon.

![Graph showing reflectance vs wavelength]
LVF – linear variable filters

A linear variable filter (LVF) has an interference coating in one direction to create a linear shift of the center wavelength across the length of the substrate.

Izovac Company produces linear variable filters for different wavelength in accordance with Customer requirements.

With its broad blocking and transmission range, a single linear variable filter can replace an entire filter set.

Advantages of the linear variable filters:

- high transmission and blocking coefficient
- wide spectral range
- wide selection of wavelength ranges
Anti-reflection display glass

Antireflection, anti-glare glass allows removing the ambient light glare, improving contrast and reducing reflection from the monitors’ surface. Such display glass most often is applied in special-purpose monitors, or monitors installed in places with strong ambient light. The product is a glass coated in a vacuum with antireflection multilayer coating. The coating can be applied both on the outer and on the inner side. If the product is directly glued to LC panel, the anti-glare coating is calculated and deposited accounting for index of refraction of glue being used to obtain the best optical performance.

Main characteristics:

- Integral transmittance coefficient, $T$ – at least 97%
- Integral reflection coefficient, $R$ – 0.5...1 %
- Chemical resistance and climatic resistance;
**Heating display glass**

Heating display glass is designed to be installed in special-purpose monitors together with LC panel, and allows extending range of displays’ operation temperatures. Additional characteristic is “demisting”. The product is a glass coated in a vacuum with antireflection multilayer coating. The coating has high transmission in the visible range. On both sides or along the perimeter current-conducting buses are deposited for soldering supply wire.

The coating can be combined with anti-glare coatings, or EMI shielding coatings. If the product is directly glued to LC panel, the anti-glare coating is calculated and deposited accounting for index of refraction of glue being used to obtain the best optical performance.

Main technical characteristics of heating glass:

- Integral transmittance coefficient, $T = 85\%$;
- Integral reflection coefficient, $R = (1.5 - 2.0)\%$;
- Sheet resistance of transparent conductive coating, $(3 - 300) \Omega/$sq;

Diagonal size 21", thickness from 0,5 to 10 mm.

**EMI shielding display glass**

The product is a glass coated in a vacuum with transparent conductive coatings, which is possible to ground. The coating has a high transmittance in the visible range. The coating can be combined with anti-glare coating. If the product is directly glued to LC panel, the anti-glare coating is calculated and deposited accounting for index of refraction of glue being used to obtain the best optical performance.

Main technical characteristics of glass:

- Integral transmittance coefficient, $T = 80\%$;
- Integral reflection coefficient, $R = (2 - 3)\%$;
- Sheet resistance of transparent conductive coating – from 3 $\Omega$/sq;

Diagonal size 21", thickness from 0,5 to 10 mm.
Oleophobic and Antifingerprint coating

“IZOVAC Technologies” has developed an oleophobic coating technology on glass and polymer surfaces. Oleophobic (anti-fingerprint) coatings could be combined with anti-reflective coatings on one glass.

IZOVAC Technologies offers an extreme long-term resistance of the coatings, keeping up to 10,000 cycles of abrasion steel wool with a load of 10 N. In this case the contact angle of water is in the range of 115-105°.

At the moment IZOVAC Technologies has possibilities to make AF coatings up to 550*650 mm glass (surface area can be increased up to several m2).

The multifunctional AR+AF coating is well suited for use in surface protection of optical glasses from contamination and mechanical scratches, wear-resistant coatings for smartphones, technical displays, touch screens, architectural glass, etc..

The main performance features of the AF coating from IZOVAC Technologies:

- A coating with a combination of anti-reflective and permanent dirt-repellent properties
- Reduces visual reflections
- Creates an extremely strong surface on touch displays
- Resists more than 10,000 cycles of abrasion steel wool with a load of 10 N
- Chemically inert
- Allows for displays with high contrast even in extremely light environments
- Durability
Contacts

"IZOVAC Technologies"

Address:
Belarus, 220040, Minsk, M.Bogdanovicha Str. 155-907, P.O. 184

Telephone
+ 375 17 3349576
+ 375 17 2931843

Fax
+ 375 17 2931845

E-mail
info@izovac.com

Web:
www.izovac-coatings.com
www.izovac.com