



Your Total Solution Partner

- Expertise in Coatings & Specialty Glass
- Concept Through Production
- Designing for Manufacturability
- Single-Point Accountability
- Innovation for Years to Come

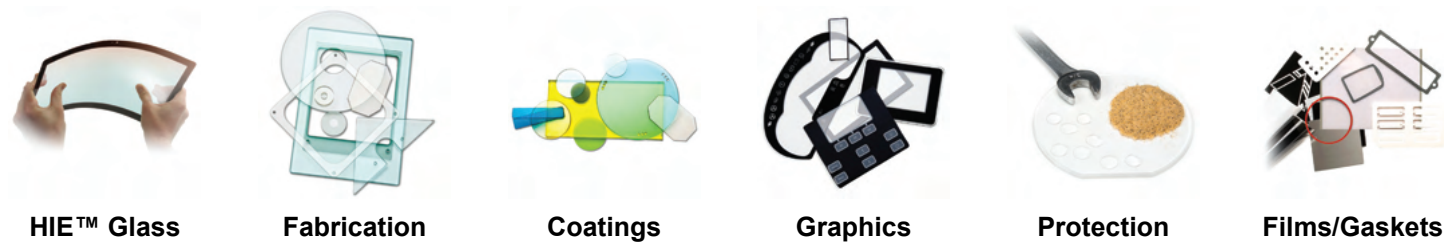
We Are Abrisa Technologies



Abrisa Technologies, a member of HEF Photonics, is a leading US based Photonics company providing custom thin film coated and fabricated technology glass and ready-to-install photonic assemblies from our nearly 125,000 sq. ft. manufacturing facilities. We partner with you from concept through production, delivering custom designed solutions to meet your application-specific requirements as well as fitness-for-use performance and volume manufacturability.

Customers of Abrisa Technologies have access to the full breadth of HEF Photonics' global capabilities which include high angle accuracy precision optics, complex assemblies for the UV to 20 microns, PVD sputtering, PE-CVD, thermal evaporation, photolithography, photomasking, reticles and targets, laser based processing, cutting, ablation, texturizing, surface functionalization, and other surface material engineering capabilities.

Manufacturing Capabilities



Abrisa Technologies' broad scope of design and manufacturing capabilities, vertical integration and single-point accountability allows you to put your trust in one company for supply chain simplicity, convenience, reduced cost of ownership, and delivery of consistent and reliable product every time.

- Float, Low Alkaline, Low CTE & Specialty HIE™ Chemically Strengthened Aluminosilicates in mm to meter sizes
- Specialize in Ultra-Thin (0.03 – 0.4mm) Glass Fabrication, HIE™ Strengthening & Coating
- Fabrication for Shape & Other Custom Features to Your Specific Needs
- Chemical or Heat Strengthening/Toughening for Damage Resistance
- Coatings for Filtering, Color, Signal Selection, High Throughput, Reflection, Transparent Conductivity, NVG Compatibility, UV & IR Management, Protection
- Screen Printing for Branding, Displays, Electrical Connectivity (Bus-Bars & Wire Bonding)
- Value-Added Assembly, Applied Films, Oleophobic, Laser Marking & Gasket Cutting
- Total Solution Product Verification & Certification

Your Total Solution Partner

Abrisa Technologies' customers are experts and leaders in their industries and best at defining the market challenges they face. Not all customers choose to focus on the photonic technology their systems and devices employ. That's where Abrisa Technologies excels. As a customer centric company, we listen to our customers' wholistic needs. As your Total Solution Partner, we offer a unique suite of specialized expertise, volume manufacturing experience, vertically integrated capabilities and services to fulfill our customers' photonic technology requirements, now and into the future. It begins with understanding our customer's market challenges, applications, and collaborating with them from concept to production, every step of the way. Customers know they can rely on Abrisa Technologies as their Total Solution Partner for:

- Expertise in Both Optical Coatings & Glass Technology
- Manufacturable Solutions Optimized for Fitness-for-Use
- Over 44 Years of Experience for Consistent Volume Manufacturing
- Unique & Integrated Capabilities for Ready-to-Install Solutions
- Total Solution Product Verification & Certification
- Program, Inventory & Supply Chain Management & Other Services
- Innovation & Production Needs, Now & for Years to Come



Specialty & Technical Glass

It all starts with the basic element, the glass. Our extensive knowledge of glass substrates and our expertise in glass properties makes Abrisa Technologies uniquely qualified to provide the best glass for optimum performance. Our Solutions Engineers find you the best matches for your application, volume, and budget needs.

High Ion-Exchange (HIE™) Aluminosilicates

- Asahi Dragontrail™
- Corning® Gorilla® Glass
- SCHOTT Xensation® Cover Glass
- SCHOTT AS 87 Ultra-Thin

Soda-Lime Float Glass

- Clear, Grey & "Colorless" Low Iron
- Low Iron Float with AR on 1 or 2 Sides
- Non-Glare with Optional AR on 1 or 2 Sides
- Patterned Glass for Lighting Control

Borosilicate Based Glass

- SCHOTT BOROFLOAT® - Low CTE & Chemically Resistant
- SCHOTT D263® Family - Thin, Clear, Low Alkaline
- Ultra-Thin Alkali-Free 0.1 to 0.2mm

Quartz/Fused Silica

- Corning® 7980 Fused Silica
- GE 124 Fused Quartz

Filter Glass

- Color Glass Filters
- Heat Absorbing Filters
- Neutral Density Glass & Grey Glass

Other & Specialty Glass

Non & Low Alkaline Glass

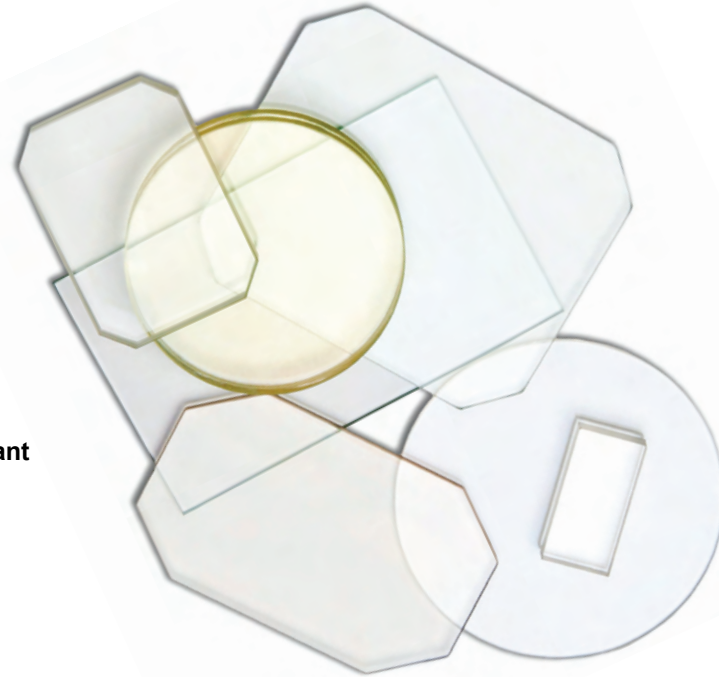
- Corning® Eagle XG® LCD Glass
- SCHOTT AF 32 Glass

Thermal, Condensation & Solar Management Glass

- Low-E TECCLEAR Condensation Control - FTO on Soda-Lime
- SCHOTT ROBAX® - Glass/Ceramic with High Heat Resistance
- UV Block & IR Solar Heat Reduction – Coating on Soda-Lime

Other

- SCHOTT N-BK7® & Other Specialty Glass
- Laminated Glass with Optional AR
- SCHOTT Superwhite B270® Flat Glass
- White Light Diffusion Flopaletch™ Glass
- X-RAY Lead Glass
- Fiber Optic Arrays



Custom Glass Fabrication

Abrisa Technologies provides custom flat glass components from small singulated wafer components to large multi meter sized protective glass solutions for display, instrument, and sensor array panels. Fabrication can be as simple as water jet cutting or as sophisticated as CNC machined and shaped parts with precision registered features suitable for airtight seals, precision controls mounting, and much more. Fabrication services are available on any of our of 0.03mm to several inch thick glass, ceramic, and specialty technology glass solutions.

Cutting

- Waterjet
- Scribe Cutting
- Hand Cutting
- Precision XY Sawing (Slicer)
- Wafer Dicing
- Ultra-Thin Glass Cutting

Machining

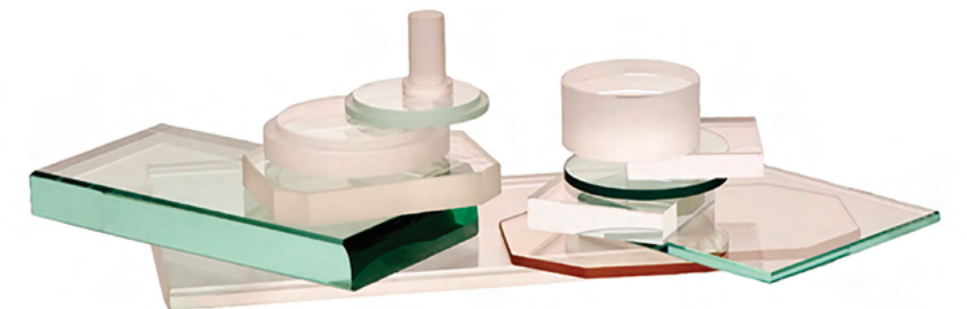
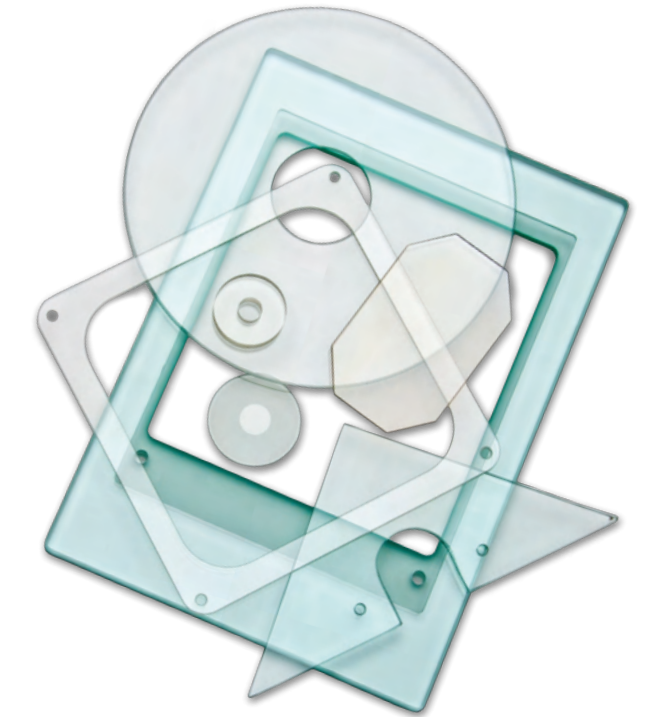
- CNC Processing
- Shaping & Circle Grinding
- Notching & Slotting
- Grooving
- Step Surfacing & Countersinking
- Drilling (Holes & Tapers)

Edge Finishing

- Angled & Multi-Level Bevels
- Seaming
- Corner Dubbing
- Radiused Corners
- Circle & Flat Grinding
- Pencil & Polished Edging

Special Options

- Laser Marking, QR & Serialization
- Sandblast (Patterns & Logos)
- Clean Room (Special Packaging)
- Protective Films & Laser Cut Gaskets
- Automated, Ultrasonic Washing
- Value-Added Assembly



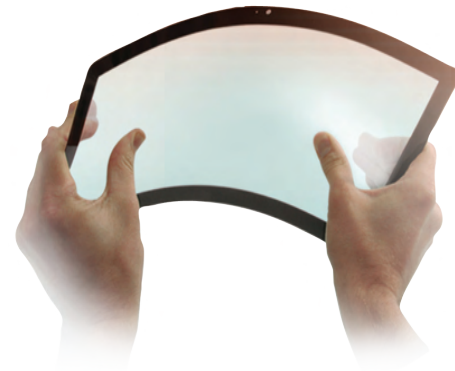
Glass Strengthening

Standard Glass Chemical Strengthening

Abrisa Technologies' chemical strengthening process toughens soda-lime, float, and other borosilicate based glasses while keeping optical distortion to a minimum through a sodium and potassium ion exchange in a salt bath. Glass can be strengthened for 8, 16, or custom hours depending on the balance of hardness and bend strength desired. Popular for displays, portable devices, defense and avionics instrumentation.



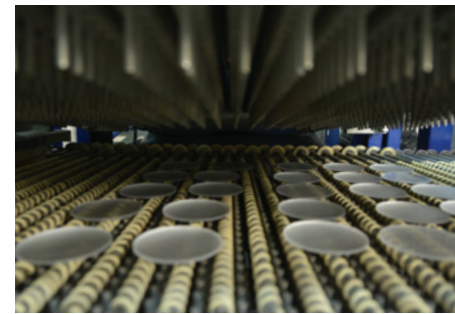
- Enhanced Break & Damage Resistance
- Small mm Sizes for Sensors, Large 46" for Displays
- Best for Glass 0.1 to 3.0mm Thickness
- FSM Depth of Layer Compressive Stress Tested



Standard Glass Heat Tempering

Tempering brings glass to its softening point of 600°C and then rapidly cools it to create high surface compression of at least 10,000 psi or 69 MPa. The process makes the glass stronger and safer than annealed or untreated glass and makes it less likely to break through thermal shock.

- Thicknesses from 3.0mm to 19.0mm
- Max Size of 29" x 33"
- Small Dice Part Break Pattern for Safety
- Non-Destructive GASP Polarimeter Compressive Stress Tested



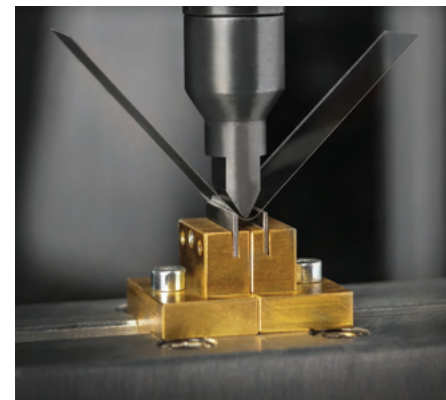
Property	Heat Tempering Change	Heat Strengthening Change	Chemical Strengthening Change (8 hours)	Chemical Strengthening Change (16 hours)
Impact Resistance*	5 to 6x	N/A	3 to 4x	4 to 5x
Bending Strength*	4 to 5x	2x	3.5x	2.5 to 3x
Resistance to Temperature*	4x	2.5x	1.8 to 2.5x	1.8 to 2.5x
Vickers Hardness*	N/A	N/A	1.4x	1.4x
Maximum Temperature*	243°C	230°C	300°C	300°C
Compressive Stress at Surface	>69MPa	24MPa to 69MPa	165MPa (24kpsi)	220MPa (32kpsi)

*Relative increase over annealed glass. 5x means 5 times greater.

HIE™ Thin Aluminosilicate Glass Strengthening

Abrisa Technologies combines High Ion-Exchange or HIE™ chemical strengthening with high native strength aluminosilicate technology glass to produce solutions with 6-8x the strength of standard float glass. The HIE™ process and special materials afford the OEM reduced thickness to support low profile devices and reduced weight for portability while delivering protection with a high modulus of rupture and superior scratch and damage resistance.

- Asahi Dragontrail™, Corning® Gorilla® Glass 3, SCHOTT Xensation® & AS 87
- Displays, Scanners, Touchpads, Windows
- Strong, Lightweight & Thin (0.1 to 2.0mm)
- Impact, Scratch & Bend Resistant
- Resistant to Temperature Changes



Precision Thin Film Coatings

Abrisa Technologies' ZC&R Coatings for Optics division delivers unique designs and precision thin film coating solutions on fabricated glass, wafers, filter glass, and other materials of our/or customer supply. Our engineers work closely with customers to understand both the application and their business needs so that our solutions not only meet optical performance needs but include considerations for "fitness-for-use" and economies of scale. Coated solutions are offered from 200nm in the UV to 20 microns in the far infrared and non-optical applications.

Anti-Reflective (AR) & Sunlight Readable

- Photopic & Oleophobic AR for Displays
- Narrowband V-Coat for Lasers & Scanners
- Broadband UV, VIS, NIR, SWIR, MWIR, LWIR Anti-Reflection for Imaging
- Wide Angle 0-55° AR for LIDAR & Sensors

Transparent Conductive (ITO/IMITO)

- Heater & Anti-Fog
- EMI Shielding
- LC Electro-Optic Switching & Filtering

Beam Splitter & Partial Transmitters

- Standard, Polarizing, Non-Polarizing, Hybrid
- Partial Transmitters for Security, Hidden LCD
- Neutral Density & Dark Mirrors

UV, Solar & Heat Management

- UV/IR Blocking, Hot & Cold Mirrors
- Blacklite™ UV Transmitting
- UV AR for 375 & 405 nm Diodes/DLP's

Bio/Chemical Compatible & Protective

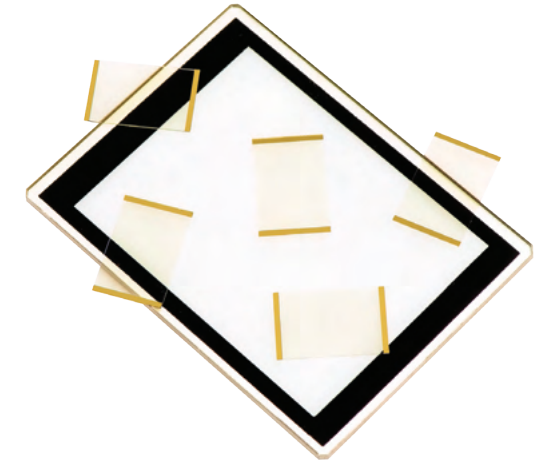
- Autoclavable for Medical & Dental
- Selective & Absorptive for Bio/Chemical Sensing
- Chemically Compatible for Bonding or Processing
- UV Transmissive for Curing or Fluorescence

Wavelength Selective & Color

- Long Wave & Short Wave Pass
- Band Pass & Notch
- Dichroics, RGB, CYM, Color Correction
- Color Temperature

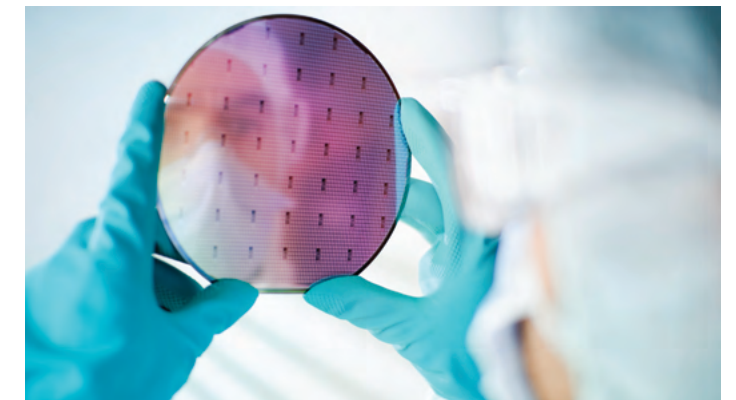
Defense & IR Control

- Hot & Cold Mirror Filters
- Infrared (IR) AR, Mirrors, Filters, Beam Splitter
- Blackeye, Covert, Semi-Covert & SWP
- NVIS/NVG Compatible



Mirror, Metallic & Bus Bar

- Gold, Silver, Aluminum, Titanium, Silicon, Tantalum
- All Dielectric – Laser, Select & Broadband
- Bus Bars – CrNiAu, Ag Epoxy, Ag Frit

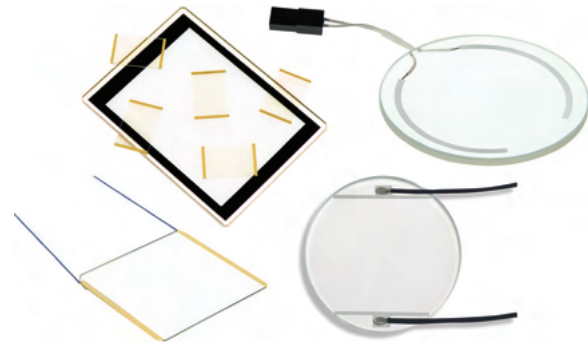


Transparent Conductive Coatings (ITO/IMITO)

Abrisa Technologies specializes in the design and PVD coating of transparent conductive Indium Tin Oxide (ITO) and Index-Matched ITO (IMITO) for use on heated windows, bio sample test platforms, EMI shielded display glass, transparent electrodes used for LC switching, and other electro-optic applications. Designs can be optimized for enhanced throughput performance in air or index matched to other mediums, as well as address a wide range of performance attributes as broad or custom viewing angles, custom spectral ranges, and challenging use environments.

ITO/IMITO Heaters for Imaging

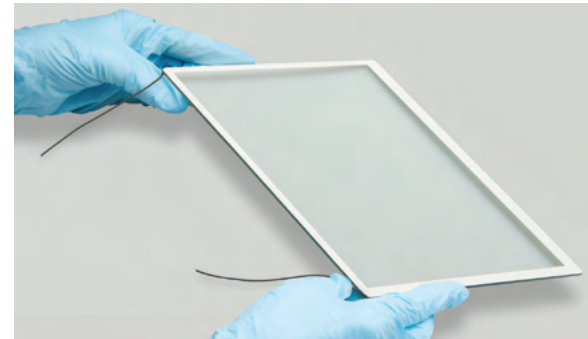
Heated ITO/IMITO windows are used for digital imaging and displays to prevent fogging and ice build-up which can obscure viewing and image capture. Anti-reflection properties, bus bars, wire bonding, and connectors for electrical connectivity, filter performance, graphics, and oleo/hydrophobics can be added for Ready-to-Install solutions.



- Single Layer, Accessible & Buried ITO/IMITO
- IMITO – Index-Matched for Bonding
- Throughput: Enhanced, Color Neutral/Bias Adjusted
- Low CTE High Clarity SCHOTT BOROFLOAT® 33

ITO/IMITO EMI Shielded Display Glass

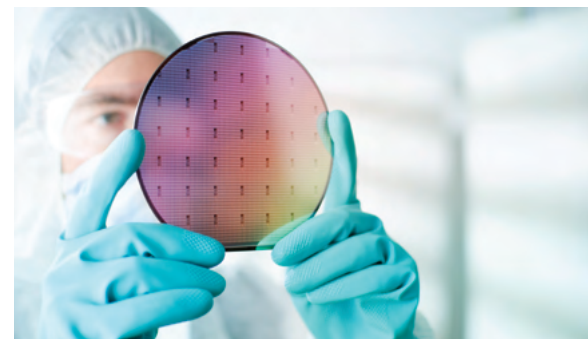
Electro-Magnetic Interference (EMI) shielding display filter glass is used on cockpit displays, medical instrumentation, and other devices sensitive to external electric field interference and/or to prevent similar from emanating while still allowing high throughput viewing or optical signal transmission to occur.



- Single Layer, Accessible & Buried ITO/IMITO
- Sheet Resistance Down to ≤ 3 Ohms/Square
- Low Diffuse Reflection, Sunlight Readability
- Full Perimeter Bus Bars - CrNiAu, Ag Frit, Ag Epoxy

ITO/IMITO for Transparent Electrodes/LCoS

ITO/IMITO is an excellent choice for use as a transparent electrode layer on LCoS and other LC based constructs or devices in need of electro-optic properties with optical transparency. Typically made with accessible IMITO on glass or silicon wafers as part of the construct for an optical switching chip or display.



- Single Layer, Accessible ITO/IMITO
- Visible, NIR Diode, Telecom, Broadband
- High Throughput, Low Scatter Coatings
- Wafers, Photolithographic Patterning (Special Request)

Popular Applications of Use

Abrisa Technologies offers many transparent and conductive coating solutions incorporating our ITO/IMITO and Indium Molybdenum Oxide (IMO) coatings, or cut to order Fluoride Tin Oxide (FTO) coatings on float glass to support applications as:

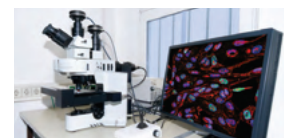
- EMI Shielded Displays for Aircraft/Instruments
- Anti-Fogging Heated Windows for Outdoor Imaging
- Electro-Optical Switching, Telecom, Deflection or Targeting
- Controlled Temperature Bio-Sample Surfaces
- Static Energy Dissipation for Satellites & Sensors



Cockpit Displays



Anti-Fogging Heater Windows



Microscope Live Cell Incubators



Electrical Conductivity

Coatings for Defense & IR Spectrum

NVIS/NVG Compatible Display Filters

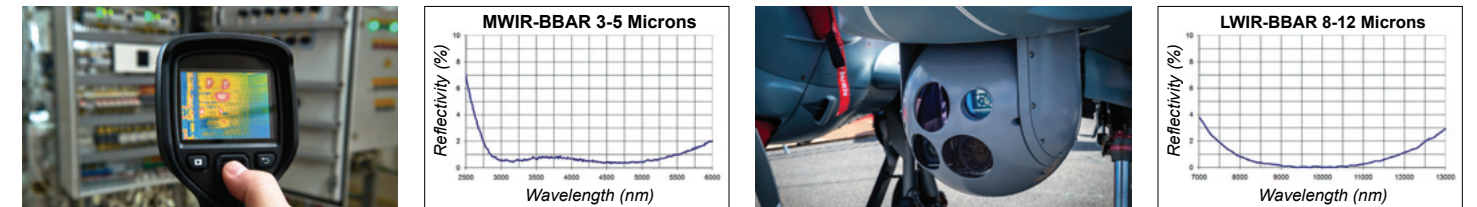


Our NVG/NVIS compatible coated display, illuminator, and indicator solutions meet the performance defined by MIL-STD-3009. Our filter solutions are custom tailored to mate with newer systems that use brighter LED's or updated LCD or OLED displays with higher throughput efficiencies and different spectral radiance characteristics than legacy sources. We define coating specifications needed for the integrated assembly to meet the NVG compatibility limits on red and near infrared radiance cut-offs and slope requirements while delivering industry leading throughput performance.

- MIL-C-48497A Durability/Environmental Requirements
- MIL-SPEC Severe Abrasion & Fast Pull Adhesion
- In-House Testing: Transmittance, Specular/Diffuse Reflection
- HIE™ Aluminosilicates & Low Iron Float, Corning® Eagle XG®
- Thicknesses 0.1 - 3.0 mm, Sizes mm's to 19 in. Squares
- NVIS White/Full Color, Red*, Yellow*, Green A & B*

*Special Request

Coatings for the Infrared (IR) Spectrum



Abrisa Technologies offers custom coating solutions for optical systems and sensors used in the Near Infrared (NIR), Short Wave IR (SWIR), Mid Wave IR (MWIR), and Long Wave IR (LWIR) spectral regions. IR radiation is often used for defense and military applications in thermal imaging for search and detect, security and surveillance, missile avoidance, targeting, and night vision. Civil, commercial and industrial uses of the IR include: Fire spotting, defect/leak sensing, UAV, geospatial and agricultural imaging, telecom, automotive LiDAR, 3D sensing, robotic and machine vision, medical and bio-imaging, and in process monitoring applications.

IR Coating Capabilities Offered:

NIR (700nm - 1600nm)	AR, Mirror, Metals, Hot Mirrors, Filters, ITO/IMITO/IMO, B/S
SWIR (1400nm - 3000nm)	AR, Mirror, Metals, Filters, B/S, ITO/IMITO/IMO
MWIR (3 - 5 Microns)	AR, Mirror, Metals, Filters, B/S, ITO
LWIR (7 - 12 Microns)	AR, Mirror, Metals, Filters, B/S, ITO
VIS Block/NIR Transmit	Semi-Covert & Covert IR Filters, Blackeye (Black Out) IR Filter

Popular Substrate Materials Coated: Ge, Si, ZnS, ZnSe, CaF₂, MgF₂, Chalcogenides, IR Fused Silica, Sapphire, InP, GaSb, InSb, Diamond, Molybdenum, Cu, Al, Stainless

Formats Coated: Glass of our Supply, Semi-Wafers, Sensor Caps, Customer Furnished Materials

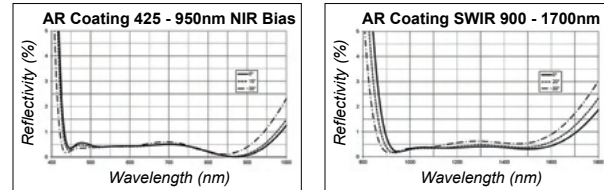
Popular PVD Metal Coatings: Gold, Silver, Aluminum, Titanium, Tantalum, Silicon, Chrome, Nickel, Hafnium

Coatings for Imaging, Sensing & Scanning

Abrisa Technologies offers coated solutions from the UV to the IR, designed for imaging, sensing, and laser scanning where high throughput efficiency, signal selection, contrast enhancement, color neutrality/correction, thermal management, electro-optical performance, and environmental robustness is required. Designs can be optimized to mate to CMOS cameras, to select signal, provide contrast enhancement, or alter spectral responsivity or output.

Broadband Wide Angle Anti-Reflection Coatings

Our broadband anti-reflection coatings provide excellent optical imaging performance with design considerations for large angles of incidence up to 55 degrees, polarization bias, low specular and diffuse reflection, color neutrality, and tough environmental use compatibility.

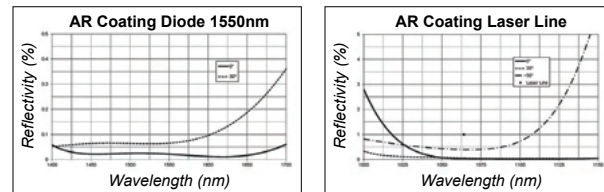


- UV, VIS, VIS-NIR, SWIR, MWIR, LWIR
- Angles of Incidence up to 55 Degrees

- Outdoor & Oleo/hydrophobic Options
- Accommodation for UV Curing/Bonding

Narrow & Laser Line Anti-Reflection Coatings

LiDAR, image scanners, 3D additive manufacturing, telecom, emitter/receivers, and electro-optic devices need low reflection to avoid unwanted 3D print artifacts, ghosting or back reflections that interfere with detection. V-coatings with $R < 0.1\%$ work best for narrow line lasers, while U-coatings with $R < 0.3 - 0.5\%$, are best for broader DLP's or diodes and large angles of incidence.

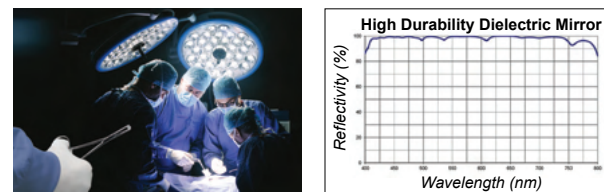


- 375, 405, 532, 633, 840, 904, 940, 1064, 1550nm, More
- Angles of Incidence up to 55 Degrees

- Outdoor & Oleo/Hydrophobic Options
- Epoxy, Graphics, Gasket, Bio-Compatible Options

Specialty Mirror Coatings - Autoclavable

Many applications require mirrors for beam steering and folded beam paths in order to fit into small footprint handhelds, compact devices or UAV's, and with high reflectance delivered on small, thin and often, lightweight substrates. In the medical and dental industries, mirrors must also be bio-compatible and survive autoclaving with high heat and humidity. We specialize in dielectric mirrors specifically designed for use in tough environments.

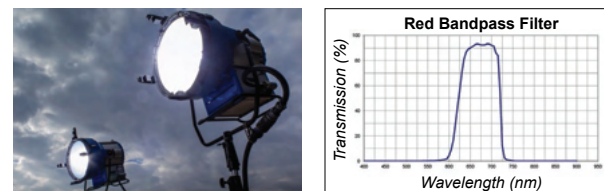


- High Reflectivity - Broadband, Multiband, Laser Line
- Angle of Incidence from 0 to 60 Degrees
- Autoclavability & Water Spot Resistance

- Bio-Compatibility, Chemical Resistance
- Low CTE & Thin Lightweight Technology Glass
- Abrasion & Scratch Resistance

Filter Solutions

Abrisa Technologies offers a wide variety of custom and cut-to-order filters for many applications from the UV to IR. Filters are often used for contrast enhancement in machine vision, signal separation at sensors, projected color or color temperature, separating or combining different spectral ranges for imaging, analysis or metrology. Filters are made from color glass, all dielectric, metallic or hybrid coatings.



- Bandpass: Dielectric, Coated Color Glass
- Color, RGB, CYM: Color Glass, Dielectric
- Color Temperature/Correction: Dielectric
- Defense: NVIS, Covert, Semi-Covert, Blackeye
- Dichroics, LWP, SWP: Dielectric

- Hot & Cold Mirrors: Dielectric
- Neutral Density: Metallic/Reflective
- UV Blocking/Transmitting: Dielectric
- IR Blocking/Transmitting
- Custom Designs

Robust Screen Printed Graphics

Screen Printing

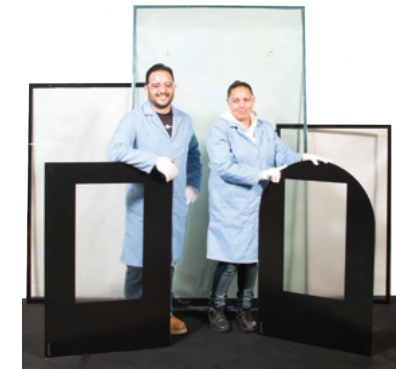
Abrisa Technologies offers screen printed graphic solutions to meet aesthetic expectations for color matched branding, feature resolution and cosmetics as well as functional needs for transmission, scratch resistance, adhesion, temperature, chemical and corrosion resistance. Printing is performed in a class 10000 cleanroom on semi and fully automated printers.



- Sizes from 0.250" (6.35mm) to 86" (2184mm)
- Full Flood, Edge Printing, Dead Front & Large Format
- Polyester, Epoxy, Frit/Ceramic Inks for Every Environment
- Multi-Color CIE/PMS Matched Inks for Custom Logos
- Complex Machining & Graphics Registration
- Feature Resolution Down to 0.005" (0.127mm)
- Conductive Ink Printing
- Bus Bars - Face, Face/Edge, "L", Wrap "U"

Extra-Large 84" Format HI-OD™ Screen Printing

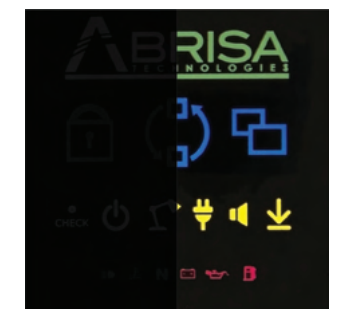
HI-OD™ Extra Large 84" format screen printing on Abrisa Technologies custom fabricated glass supports larger "framed" and branded viewing areas for use on retail and commercial digital signage, gaming tables, in home entertainment, and other large format displays.



- Multi-Layer Process for Low Profile "Pinhole Free" Opacity
- "Halo-Free" Appearance after Bonding
- Black or White, Matte or Gloss Finish
- Proprietary Epoxy Ink Formulations
- Custom Design Elements & Logos
- Large Conductive Ink Bus Bars

Dead Front "Hidden Icon" Printing

Dead Front screen printing is used on human interface and control panels where seamless aesthetics are desired and backlighting is used to call attention to icons and alpha numerics as required. Dead Front panels can be found on instruments, appliances, kiosks, displays, vehicle cabins, cockpits, and more.



- 5-10% Backlighting Throughput
- Survives Acetone Rub Test & Temperatures to 400°F
- Meets Class 4B, 5B Crosshatch Razor Scribe
- Meets Adhesion Standards of ASTM D3359



Ready-to-Install Value-Added Services

Abrisa Technologies complements its suite of coating and glass fabrication manufacturing capabilities with the convenience of additional Value-Added Services and the cost savings of our Single-Point Accountability. Complete a solution with laser marking for identification and tracking, add safety or optical films, oleo/hydrophobic properties, install gaskets, then have it delivered to your production line in protective, multi-pack, or cleanroom packaging ready-to-install.

Laser Marking

Abrisa Technologies offers in-house CO2 laser marking of select uncoated and coated products. Parts can be marked with non-removable identification and LOT information without any added profile or chemistry to worry about.

- Edge & Face Printing up to 18" High
- Alpha-Numerics 2.8 mm to 7.1 mm High
- QR Codes, Serial & Part Numbers
- Human Readable & Non-Removeable
- Options - Fonts, Branding, Icons



Oleo/Hydrophobic Solutions

Hydrophobic and oleophobic solutions help to reduce cleaning time and fingerprint visibility, enhance scratch resistance and prolong clarity in outdoor environments. Ideal for high traffic scanners, touch screens, outdoor cameras, and sensor windows.

- "Steel Wool" Abrasion Resistant Options
- Outdoor UV & Weather Resistant Options
- 1-Sided, 2-Sided, Masked & Coated Solutions
- Customer Furnished Chemistries Applied



Optical & Safety Films

Optical performance, safety and aesthetic features are sometimes best accomplished with the incorporation of films applied as part of a Total Solution. Abrisa Technologies offers in-house custom film patterning and application services.

- Custom Film Pattern Generation
- UV, IR, VIS, Transparent & Blocking Films
- Aesthetic Films – Metallic, Tint/Color, Branding
- Safety, Damage Resistance, Anti-Fog, Security



Mounting Tapes, Gaskets & Assembly

Abrisa Technologies offers convenient Total Solution services for the application of mounting tapes and gaskets to coated, screen printed, and fabricated optical components as well as mounting onto metal brackets for Ready-to-Install assemblies in need of an environmental seal.

- Mounting, Sealing & Damage Resistance
- Value-Added Laser Cutting & Application Services
- Supply Chain Managed or Customer Furnished
- Single-Point Accountability - Ready-to-Install



Services for Customer Furnished Material

Specialty PVD Coating Design & Processing Capabilities

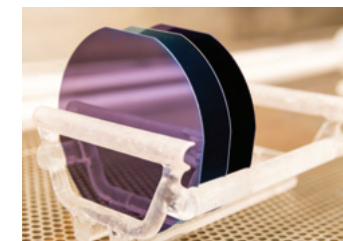


- Index-Matched Coating Designs
- Patterning - Photolithography/Shadow Masking
- Controlled Thickness Non-Optical Films



- Chemical & Damage Resistance
- Bio-Compatibility & Autoclavability
- Oleo/Hydrophobic, UV & Thermal Survival

Processing Services for Customer Furnished Materials



Coating Design & Deposition

- Optical Coating Design & PVD Deposition
- Coating on Parts with Pre-Existing Coatings
- Coatings with Oleo/Hydrophobicity
- CrNiAu & Metallic Bus Bars
- Non-Optical Performance Coatings



Fabrication, Features & Marking

- Add Features (Holes, Notches, Grooves, Step Edges)
- Fabrication to Final (Sheet, Filter, Wafer)
- Waterjet, Saw Cut, Scribe Cut, CNC, Circle Ground
- Buffing, Lapping, Surface/Edge Grinding, Polishing*
- Laser Marking, Ablation, Sandblasting

**Select Capability*



Damage Resistance & Safety Solutions

- HIE™ Chemical Strengthening
- Heat Tempering ≥ 3.0mm (Float, Borosilicates, Other)
- Safety Films, Anti-Graffiti & Other Applied Films
- Lamination for Select Sizes & Formats
- Oleo/Hydrophobics & Hard Coats

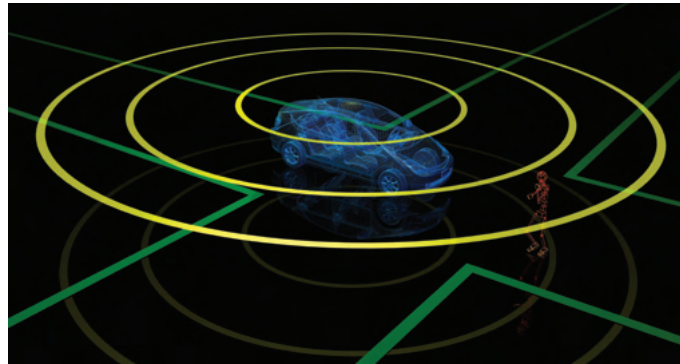


Other Value-Added Services

- Screen Printing, Bus Bars, Conductive Inks
- Laser Cut Gaskets & Bracket Mounting
- Assembly & Wire Bonding
- US-Based Inventory, Supply Chain Management
- Special Packaging

The Markets We Serve

Imaging/Sensors - Security/Threat, LiDAR (Autonomous), Traffic



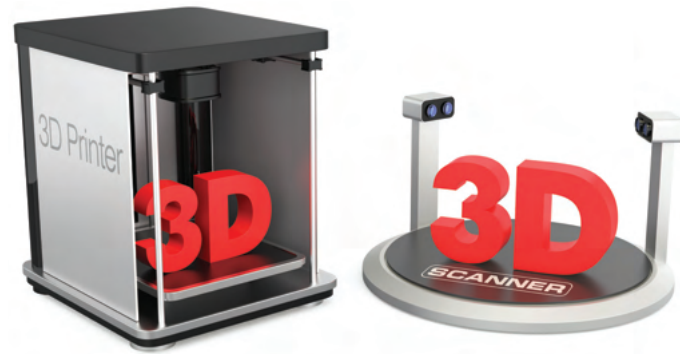
- Wide Angle 0-55° Image Sensor Windows
- Broad Spectrum - UV/VIS, VIS/NIR, SWIR, MWIR, LWIR
- Damage Resistant HIE™ Technology Glass
- Dead Front Graphics Control Panels
- Oleo/Hydrophobic Cleanable Solutions

Display - Digital, Immersive & Interactive Displays



- Damage Resistant HIE™ Aluminosilicates
- Hidden LCD Mirrors, Dead Front Graphics
- Sunlight Readable Coatings & UV/IR Blockers
- Near-to-Eye Display Partial Transmitters
- Ultra-Thin, Lightweight & Flexible Glass

Industrial - 3D Printing, Machine Vision, Process Control



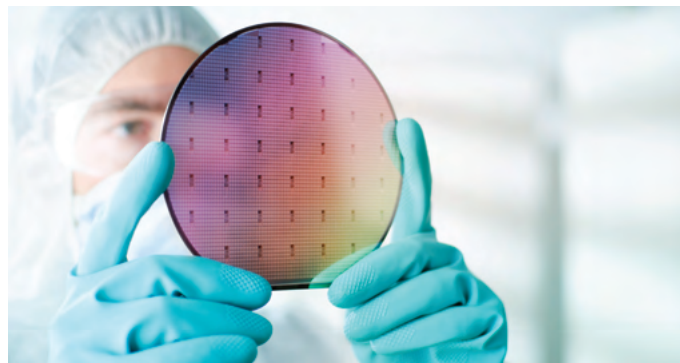
- Laser Scanning Mirrors & Windows
- Bandpass & Contrast Enhancement Filters
- Low Expansion 3D Printing Build Platforms
- UV Transmissive Coatings for Curing
- Ultra-Thin Touch Panel Glass

Defense/Avionics - Controls, Targeting, Threat Detection, Simulation



- EMI Shielding (ITO) Enhancement Glass
- NVIS, Covert, Blackout, Signal Selective Filters
- Non-Glare (NG) & Damage Resistant HIE™ Glass
- HUD/HMD Beam Splitters, Scanning Mirrors
- Anti-Fog (ITO) Heated Transparencies

Micro-Opto/Semiconductor - Wafer Components, Process Tools



- Transparent Conductive Coatings (ITO/IMITO)
- Anti-Reflective, Metallic, Filter & Dichroic Coatings
- Wafers, Coatings, Bus Bars, Dicing
- Protective & Epoxy Compatible Coatings
- Cleanroom Protocol, Ultrasonic Cleaning

Medical/Dental/Bio - 3D Imaging, Surgical, Biosensors



- Bio/Chemical Compatible Components
- Autoclaveable Mirrors & Windows
- Heated Biocompatible Sample Windows
- Wavelength Selective Filters
- AR, Filter & Sensor Coatings

Glass Fabrication



Coating Deposition



CNC Machining



Strengthening - Chemical & Heat



Screen Printing of Graphics



Abrisa Technologies, a member of HEF Photonics, is a globally recognized technology glass fabrication and optical thin film coating company with expertise in high volume manufacturing and engineering capabilities, delivering Total Solutions that provide excellent performance, fitness-for-use, and economies of scale.

Our US based, state-of-the-art ISO 9001:2015 and ITAR registered facilities include Abrisa Industrial Glass in Santa Paula, CA and ZC&R Coatings for Optics in Torrance CA. These two divisions produce solutions from cut-to-order coated glass components to custom complex and ready-to-install fabricated, strengthened, optically coated, electronically enabled, and branded sub-assemblies.

Our Total Solutions serve a variety of markets including Micro-Electronics, Defense and Avionics, Display, Industrial Automation, Optical Sensors, Imaging, Photonics, Medical & Dental, Life Science, and more.



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