



220 Huff Ave, Suite 400
Greensburg, PA 15601



PH: (724) 552-4904
F: (724) 552-4905



sales@agdisplays.com
agdisplays.com



Advanced LCD Solutions Specialist

MINING, OIL & GAS SOLUTIONS



**BONDING DESIGNS
TURNKEY & DESIGN
CUSTOM GLASS SUPPLY**

About Us



For over a decade AGDisplays has been a leading provider of high quality LCD enhancement products and services for the industrial markets. We lead the way in offering an extensive range of custom panel solutions that improve standard display attributes while maximizing performance in any environment. The AGDisplays teams are experts in LCDs, from building simple or complex designs to integration work.

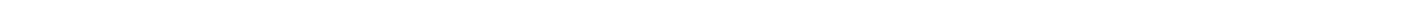
In our 124,000 sq. foot facility, we offer over 800 off the shelf products that include tablets, open and closed frame LCDs and much more. Our knowledge in innovative LCD technology and our high-quality control standards separate us from the rest. At AGDisplays, our teams have a true commitment to being your trusted partner.



OUR SERVICES

- Off The Shelf LCD Products
- NVIS Integration and Design
- OCA, Optical & Bonding Services
- Custom LED Integration & Design
- Touch Screen Integration & Design
- Custom Glass Supply Services
- Turnkey & Design Services
- EMI Shielding & Design

- Film Enhancements & Repolarization
- Certificated FAA Part 145 Repair Station
- Component Assembly & Integration
- LCD Controller, Cabling & Design
- Testing/Certification of EOL Panels
- Drop-in Replacement
- Industrial Repair Program
- Zero Dead Pixel Inspection



Industries Served



MILITARY



AVIONICS



HOTEL



MARINE



MARKETING



MEDICAL



RESTAURANT



RETAIL



TRANSPORTATION



Mining, Oil & Gas



AGDisplays supports the Mining, Oil & Gas Industry by offering LCD displays durable enough to operate on exploration rigs, refineries and pipeline operations.

Our LCDs are equipped with the ability to withstand shock/vibration, extreme temperatures and exposure to water & debris. We offer ruggedizing solutions that can enhance durability and increase longevity.

Sunlight readability and high bright LEDs are available to be integrated into new or existing LCD designs. Tempered or chemically strengthened glass, paired with a high performing bonding method, provides protection and durability to your unique application.

All design solutions are dependent on individual applications and lead to a completely unique technical solution to fulfill customer requirements.

Our team can help you acquire new, EOL or refurbished LCDs, and can customize virtually any panel to meet your specific requirements. From a simple spec enhancement to full solution kitting, AGDisplays handles LCD sourcing, logistics, assembly and repair—all in one place.



RUGGED MOBILE

These devices meet military standards for shock & vibration, limited water submersion and dust ingress.

PANEL MOUNT DISPLAYS

Panel mount displays are designed for industrial environments and can be outfitted to meet specific requirements.

GLASS SUPPLY

Optical clarity, display strength with integrated coverglass & custom screen-print designs.

BONDING DESIGNS

Full range of custom OCA, optical or tape bonding for rugged enhancements.

TURNKEY & DESIGN

Work with our team to create turnkey solutions on new or existing designs.

EMI SHIELDING & DESIGN

Block electronic interference between LCDs & surrounding equipment with EMI solutions.

TOUCHSCREEN INTEGRATION

We offer popular technologies like projected capacitive, resistive, surface capacitive, IR, and SAW touch sensors.

FILM ENHANCEMENTS

Increase LCD functionality, versatility & performance. Retrofits into any sized LCD.

INDUSTRIAL REPAIRS

Reduce costs by repairing LCD components with full outgoing diagnostic analyses on all units.

List of Products



RUGGED MOBILE

These devices meet military standards for shock & vibration, limited water submersion and dust ingress.



TABLETS

AGDisplays makes commercial off the shelf tablets easy to purchase with flexible spec options and easy purchasing.



TOUCH DISPLAYS

Our touch panels are eligible for performance upgrades like ruggedization, optical bonds and EMI protection.



LCD DISPLAYS

Our LCD design solutions maximize standard LCD performance in any environment.



MEDICAL DISPLAYS

Our LCDs support medical applications with long life cycles, high bright display readability and sharp contrast.



MARINE DISPLAYS

Marine displays can be IP rated and are designed specifically for use in all marine/boating applications.



DIGITAL SIGNAGE

Digital signage offers fast on-sight installation and easy access for maintenance & repairs.



PANEL MOUNT DISPLAYS

Panel mount displays are designed for industrial environments and can be outfitted to meet specific requirements.



TOUCH TABLES

Hold meetings and communicate business messages with superior and sensitive touch table technology.



MULTIMEDIA KIOSKS

AGDisplays offers a wide range of multimedia kiosks to effectively reach your customer.



SPECIALTY DISPLAYS

Bring interaction, creativity and technology together with 3D displays, all in ones and interactive whiteboards.



VIDEO WALLS

With narrow bezels for a seamless feel, users are captivated by the media displayed on our video walls.



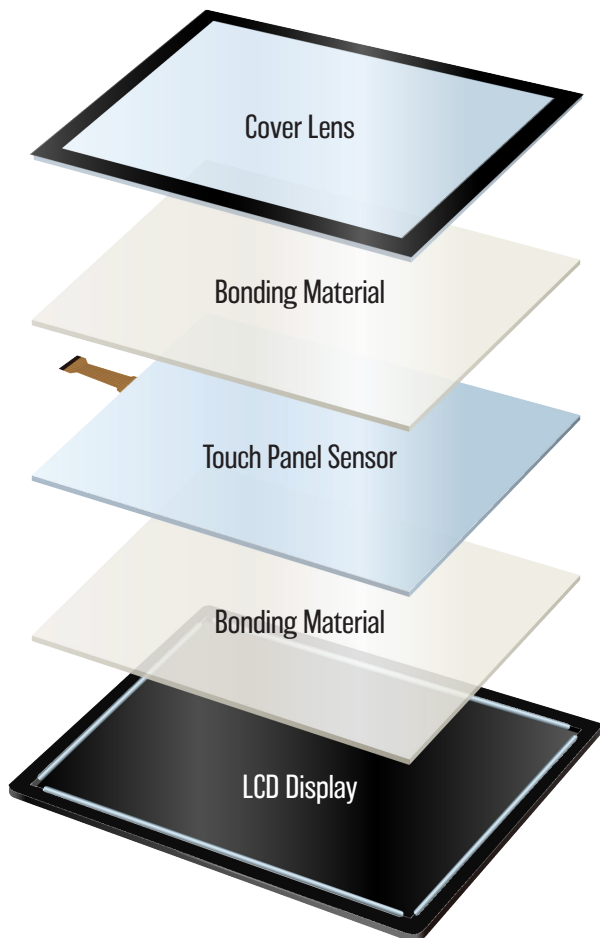
Custom Glass



Display assemblies with integrated strengthened cover glass have become a popular solution in years past. Utilizing a glass substrate has the superior advantage of increased hardness and scratch resistance as well as having a higher design value.

Pairing glass with various strengthening methods increases the robustness even more. AGDisplays offers a variety of cover glass options to add durability and protection to an LCD. Each material substrate provides unique benefits. Glass options we offer include chemically strengthened soda lime: clear and tinted, grey glass, low iron, AG etched, low emissivity, heat absorbing float glass; AGC Dragontrail™; Corning® Gorilla® Glass.

AGDisplays integrates the cover glass displays using a process called bonding. We offer three different bond integration methods: optical bond, OCA bond, and tape bond. Service options are available based on the size and specifications of your project.



BENEFITS

- Chemically-Strengthened
- Scratch and Crack Resistant
- Improved Surface Quality
- Enhanced Response
- Thin and Light without Fragility
- Promote Sunlight Readability
- Ruggedized
- Protection From EMI Interference

Custom Glass



CAPABILITIES

CUTTING

- Water jet: max material size 90"x46", min material size 2"x2"
- Scribe cutting: excalibur, bystronic, TLC, handcutting, precision XY sawing

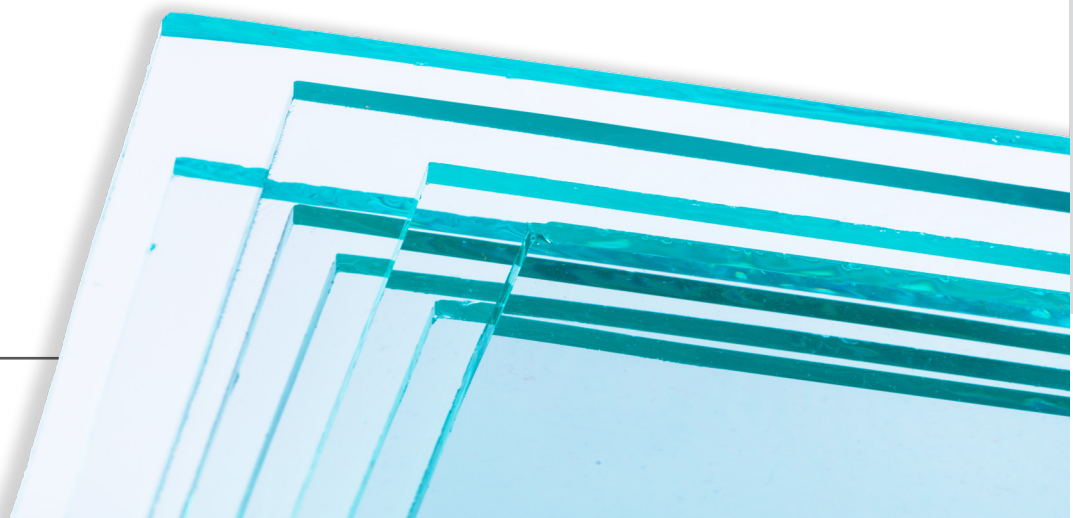
SCREEN PRINTING

- Ekra X4, Argon - Large, Cameo/Saturn, Saturn, Custom Press
- Ink types: epoxy/polyester, frit
- Etching & bus bars: Ekra X4, Cameo 18, Cameo 30, Saturn
- Edge printing

EDGING

- Angled and multilevel bevels, seams, corner dubbing, circle & flat ground, pencil & polished
- Edge types: flat ground, flat polish, flat polish with arris, pencil ground, pencil polished, safety seamed, dubbed corners, stepped and route surfaces, beveled edges, bullnose edges (half & full)

EDGING



Custom Glass



CHEMICAL STRENGTHENING

STANDARD SODA LIME

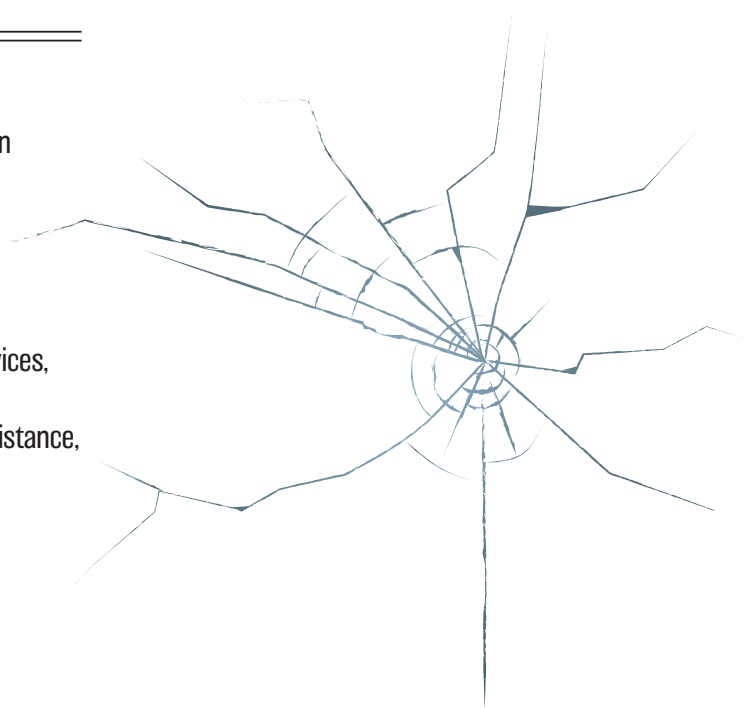
- Soda lime is toughened through a sodium and potassium ion exchange. Often requested for thin display applications
- Thickness: min .30 mm - max 19 mm

HIE GLASS

- 6-8x stronger than float glass.
- Typically used for electronic displays like tablets, mobile devices, touchscreens.
- Improves impact resistance, flexibility strength, scratch resistance, resistance to temp changes.

HEAT TEMPERING (ASTM C-1048-04)

- Heat strengthening
- Safety tempering (dices when broken)



POPULAR OPTIONS

AGC Dragontrail™ is a chemically strengthened and tempered float-glass material that is 6x more durable than soda lime glass. With this strength, the glass can be produced in thinner material.

Vicker's Hardness

Unstrengthened	596 kg f/mm ²
Strengthened	673 kg f/mm ²

Thickness Availability

Standard	0.8 to 1.1 mm
Special Request (MOQ req.)	0.5 to 5.0 mm

Corning® Gorilla® Glass is a thin sheet glass with a high degree of chemical strengthening. Benefits of Gorilla® Glass include high scratch resistance, high retained strength after use, and pristine surface quality.

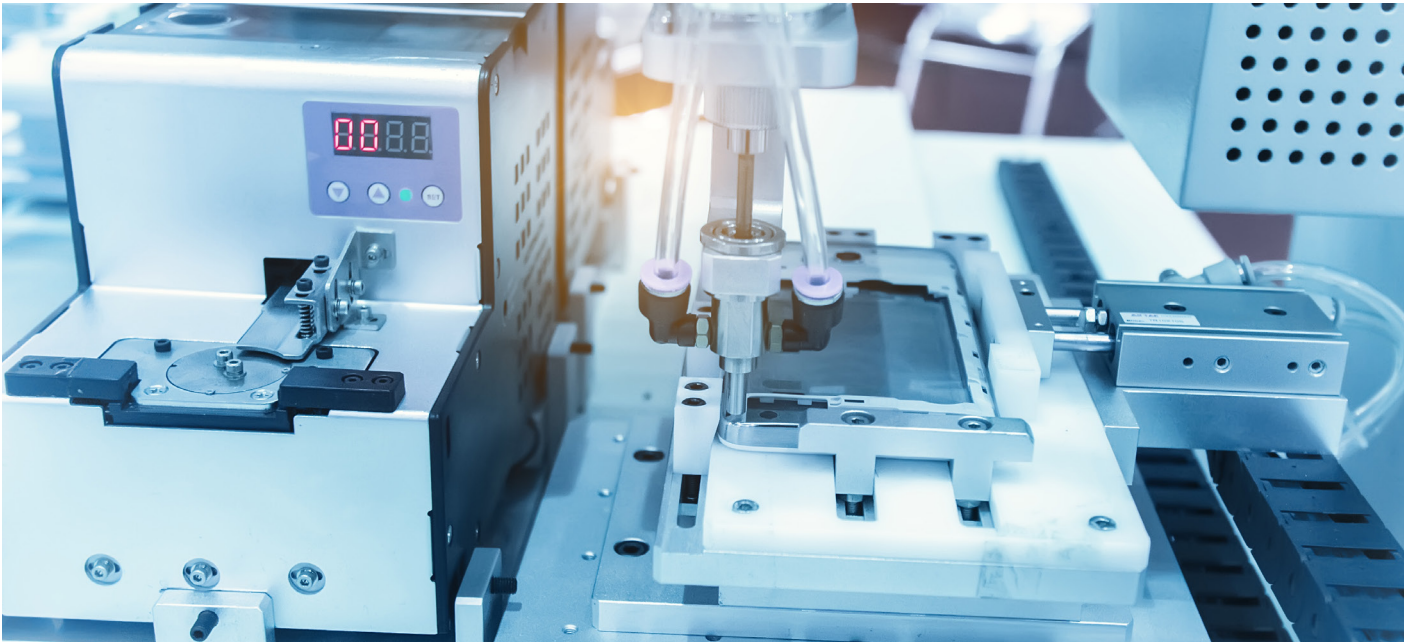
Vicker's Hardness

Unstrengthened	534 kg f/mm ²
Strengthened	649 kg f/mm ²

Thickness Availability

0.4 mm to 2.0 mm

Bonding



AGDisplays offers three different methods of bonding for your LCD to add strength and clarity, as well as using it as an integration method when incorporating one of our other value add services. In performing a bonding procedure on your LCD, your display will be more rugged and less prone to environmental vulnerabilities such as dust collection and moisture condensation.

Often, LCD designs that add hardware to the LCD, such as touchscreens or front cover glass, are constructed in such a fashion that air gaps are left in between the layers of its components. Internal reflections are created by these air gaps created between these layers. Gaps create internal reflections, and internal reflections decrease optical clarity as well as leave the LCD vulnerable to contamination.

Applying a bond solves much of the refraction and other vulnerabilities mentioned, depending on the application requirements.

Optical clarity and readability may also increase because of

the refractive layers being decreased. The lower the refractive surfaces, the increase in clarity and transmission.

Bonding methods are performed in one of AGDisplays' Class 1000 clean rooms. A clean room is used across various industries where tiny contamination particles may be susceptible for intrusion in the manufacturing process. A clean room is a controlled environment that is specifically designed to keep levels of air pollutants very low. AGDisplays performs all critical manufacturing processes in clean rooms, including our bonding services.

OCA Bonding



Displays and touch panels are at their best when they perform with highly transparent, low-haze, and UV resistant features. Adding an optically clear adhesive to your LCD's stack up promotes these features.

OCA bonding is considered a safe and effective alternative to costly liquid optical bonding. There are various advantages to choosing OCA bonding as your preferred integration method. Like liquid bond, OCA reduces the reflection layers in a panel. OCA bonding is clean, which eliminates the need to clean up residuals after the bonding process is complete. The process produces high yield and is repairable.

SUBSTRATES	OCA PRODUCT SIZE CAPABILITY
LCD	1"-12" (typ) diagonal max
Touch Screens	1"-12" (typ) diagonal max
Mobile Devices	Samsung Galaxy S4, S5, Note 3, Note 4, Apple iPhone 6,6+
Glass, Polycarbonate, Transparent Materials, Acrylic	9"x13" max/15" diagonal size
Optical Lenses	9" max diameter

BENEFITS

- Increased readability and brightness.
- Strengthened Durability
- High Adhesion
- UV Protection
- Bare ITO Compatible
- Whitening and Yellowing Resistant
- Removes moisture/condensation and debris to increase viewability
- OCA strengthens structural stability to outstand rough environments.
- OCA creates a single optical layer, reducing glare and increasing optical clarity.

Optical Bonding

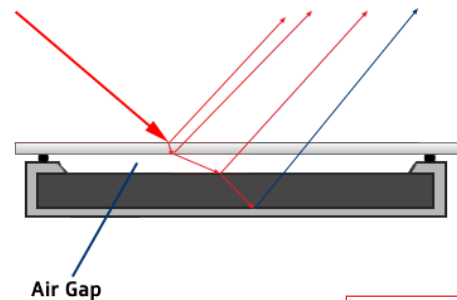


AGDisplays offers optical bonding for panel sizes as large as 21.5 inches. This robust solution may involve a full lamination, consisting of two outer substrates sandwiching layers of adhesives and other elements. The solution creates superior LCD strength, prevents a screen shatters and is less vulnerable to contamination & moisture. It also provides extended operational temperature range and increases touch response. Substrates available are glass, polycarbonate and acrylic. Laminated applications can include: EMI shielding, privacy filters, enhancement filters and security screens.

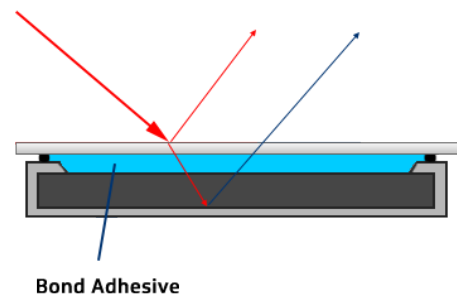
Optical bonding increases quality and lifespan of an LCD, keeping overall replacement costs low. Although our optical bonding service is the strongest bonding service we provide, the solution is reworkable through our production process. AGDisplays performs quality assurance measures and testing on each LCD to ensure specifications are met. Our facility is capable of performing low and high volume production.

BENEFITS

- Optical performance: increased luminance & contrast, reduced internal reflections
- Ruggedization: superior LCD strength and prevents shattered screens
- Reworkable through production process
- Halogen-free: low toxicity, environmentally-friendly materials
- Excellent UV resistance
- Extended operating temperature range

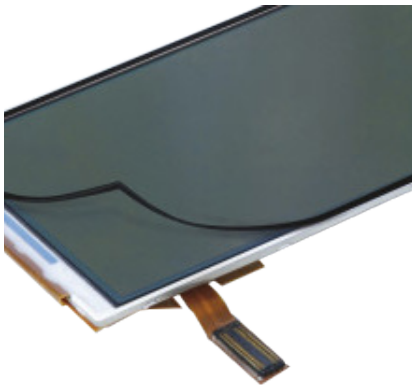


BEFORE



AFTER

Tape Bonding



When optical bonding is not practical for your LCD, AGDisplays offers tape, or perimeter, bonding. Perimeter bonding helps your company save on costs while still sufficiently ruggedizing your panels. Our tape bond services provide a secure bond that increases LCD flexibility, long-term durability and improved appearance. The adhesive offers a wide temperature specification, allowing a durable integration method in various environments.

Our technical experts manually perform each bond with precision inside a class 1000 clean room. AGDisplays supports virtually any manufacturer of LCD and touchscreen. For cover glass shield protection, AGDisplays can work with your requirements to offer products and glass materials to achieve your exact requirement. Consult AGDisplays today to speak with a representative about which option is best for your project.

BENEFITS

- Retrofitted to All LCDs
- Bond with High Adhesion
- Withstand Static or Dynamic Strength
- Continuous Bond Distributes Stress Over Entire Bond
- Viscoelastic
- Resistant to Extreme Weather
- Seal Against Environmental Conditions



Turnkey Design



A turnkey LCD solution is a project built so that the end customer is sold a completed LCD product, ready for use. It is our specialty to take on the responsibility for designing and developing a product that is ready to be used upon completion.

We have a team of experts ready to take on any challenging turnkey LCD need you have. AGDisplays offers in-house assembly, testing and quality measures, packaging and drop ship capabilities. We are able to accommodate small and large volume production quantities.

LCD turnkey projects involve kitting LCD peripherals and components or just selling commercial off the shelf LCD products that are applicable across all industries.

BENEFITS

- Project administration and management control
- Subcontracting
- Focus on the total integrated system
- Considerable experience and skill in panel selection
- Development team that provides options based on budgets
- Quality functionality testing
- Inventoried spare parts
- Focus on procurement efficiency and flexibility
- Experience and expertise in all major industries, applications, and environments
- Quick reaction time, less opportunity for miscommunication
- Hassle-free design changes
- Cost targets high priority
- Adherence to all US industry standards and specifications
- Regular shipments to destinations around the world
- Comprehensive technician training and familiarity of quality improvement methods
- Complete factory testing prior to shipment
- In-house assembly, testing and quality measures, packaging and drop ship capabilities

Touch Integration



Touchscreen technologies are not all created equal. In fact, their structures and features differ widely from technology to technology. From the simple touchscreen on a home printer, to the quick touchscreen experience of the latest smartphone. With ACDisplays, you're not the end user, you are the creator. With so many sizes, technologies and specifications floating about, it's impossible to just select one from the masses without being informed first.

SURFACE ACOUSTIC WAVE

FEATURES

- High Transmission
- Durable glass construction
- Pressure sensitive
- Advanced technology

END USER BENEFITS

- High optical clarity
- Rugged in indoor environments
- Activated with stylus, glove or fingernail

INDUSTRIES

- Medical
- Touchscreen Kiosks
- Indoor Retail Environments

Touch Integration



RESISTIVE

FEATURES

- Low light transmission at 75%
- Activation with any object
- Protective substrate on top of glass layer
- Able to be assembled from component parts, screen and sensors

END USER BENEFITS

- No glass shattering
- Works in rain or other liquids
- Good functionality in hot or cold weather
- Input is acceptable with any stimulus: finger, pen, gloved fingers, stylus, and anything else

INDUSTRIES/APPLICATIONS

- Marine
- Commercial
- Food and beverage

PROJECTIVE CAPACITIVE

FEATURES

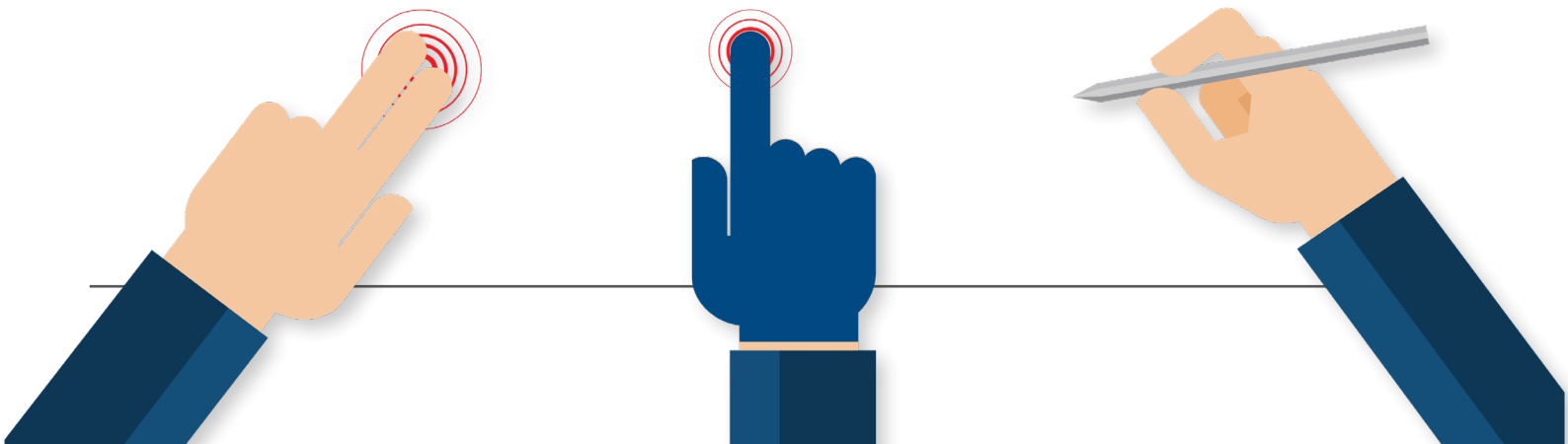
- Integration with various cover lens options: standard, tempered, chemically-strengthened glass
- Single, dual or multi-touch
- High light transmission, in excess of 90%

END USER BENEFITS

- Superior image clarity
- High durability in rough environments
- Flexible touch points
- High transmissivity
- Input triggered by bare hands, latex gloves and stylus

INDUSTRIES/APPLICATIONS

- Retail
- Gaming
- Digital Signage



Touch Integration



SURFACE CAPACITIVE

FEATURES

- Fast, sensitive touch response
- Glass layer for ruggedization
- Protective cover

END USER BENEFITS

- Good image clarity
- Highly scratch resistant
- Fingertip or stylus activation
- Durable in rough environments
- Resistance to contaminants and liquids

INDUSTRIES/APPLICATIONS

- Gaming
- Entertainment
- Point of Sale
- Kiosks

INFRARED

FEATURES

- High light transmission
- No glass substrate
- Light beam touch technology
- Scratch resistant

END USER BENEFITS

- Unlimited touch life
- Durable lifetime
- Superior image quality
- Finger and glove touch activation

INDUSTRIES/APPLICATIONS

- Retail
- Hospitality
- Large Display Applications

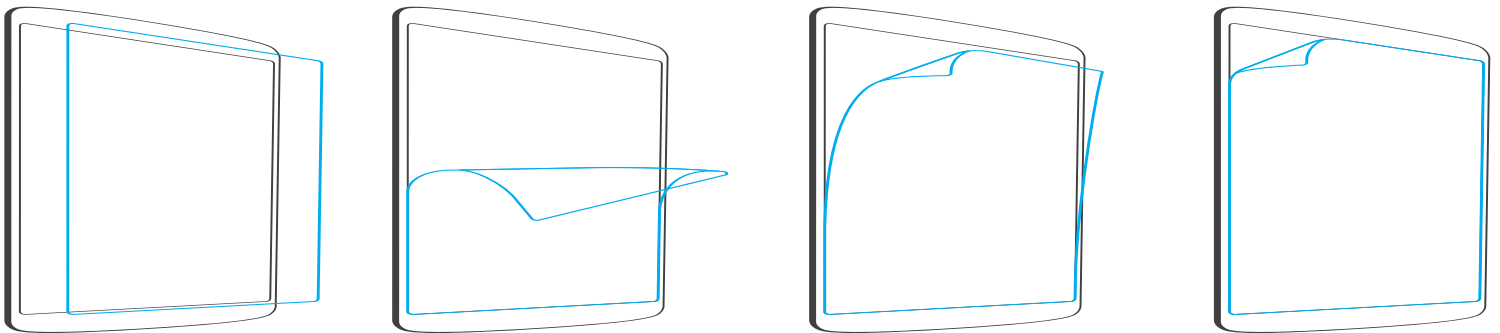


Film Solutions



Increase brightness, eliminate reflection and glare, prevent EMI interference, add privacy features and more, just by integrating a film enhancement to your LCD configuration. LCDs purchased off the shelf are likely not properly built for extreme and industrial conditions, so AGDisplays offers quick and easy LCD solutions to achieve readability and clarity levels without having to upgrade to new and expensive LCD technology.

Film enhancements working with LED backlight sources and ambient light to optimize light refraction for enhanced clarity and image quality. Our film products are easily integrated into your current LCD, and may be retrofitted into any sized solution. This service is a passive enhancement, meaning there is no change in neither electrical components nor additional wattage consumption.



Since film enhancement is non-evasive, power consumption remains the same, and there is no concern to readjust thermal management.

Our most popular high bright solution can increase brightness by 40-140% and intensify color contrast, optics, brightness and overall image quality. Brightness increase doesn't increase LCD power consumption. So, how does it work? While one film refracts light towards the viewer, a second film reflects the light back into the LCD, essentially recycling the light until it exits the LCD.

Due to the limitless variations in LCD specifications, AGDisplays builds film enhancement per customer project so that we can guarantee a optimized design specifically for your panel.

BENEFITS

- Up to 140% increase in brightness without increase in power consumption
- Increased display contrast and readability
- Enhanced optics and image clarity
- Increased side-viewability
- Front glass protection
- Resistance to scratches and contaminants
- Increased color sharpness
- Privacy of information

Film Solutions



ANTI-GLARE

Anti-glare (AG) treatments minimize reflections from ambient lighting, noticeably improving readability. AG applied to glass and other substrates reduces surface reflection. The textured film diffuses specular reflections, removing the external reflection a user may experience. This film also improves scratch resistance. AG gives a matte appearance on the front of the LCD.



ANTI-REFLECTIVE

Anti-reflective (AR) film improves the durability and life-time of your display surface. Anti-reflective properties increase the contrast and sharpness as well as decrease the reflection from your LCD screen without having to increase your LCD's power consumption. Anti-reflective film can be identified as having a slightly purple tint.



BEF

Brightness Enhancement Film or BEF film can increase the brightness of LCDs through utilizing refraction and reflection, increasing the efficiency of your backlight source. Light exits the LCD at a specific angle; light outside of this angle is reflected back into the LCD until it exits at the proper angle. Multiple BEF films used in unison can enhance light properties.

DBEF

Dual Brightness Enhancement Film (DBEF) is another thin film reflective polarizer that enhances LCD brightness. It uses light normally lost to absorption in the bottom LCD polarizer and redirects it until allowing it to exit the LCD backlight assembly. Using DBEF film in conjunction with BEF film can often offer the highest yield of light output.

Film Solutions



ESR

Enhanced Specular Reflector (ESR) is designed to maximize the usage and distribution of light from the LCD's light source. ESR film allows light distribution from the backlight to increase the LCD's viewing angle. This film used with other brightness enhancing films can obtain the highest light output. Good solution for LCDs used in direct sunlight light.

PRIVACY FILMS

ACDisplays' privacy film solution decreases viewing angles, allowing an increase in privacy by keeping information away from prying eyes. It works by controlling the distribution of light in relation to the viewing angle of the display. Light control films direct light only in the direction of the user; viewed from the front, the display is clear and bright. Viewed from either the left or right side, the display view is black.



LIGHT DIFFUSION

Diffusion films improve LCD functionality by providing brightness uniformity throughout the active area. Light travelling through the stack up of an LCD will have no inherent direction and will be travelling in all directions. The function of the diffuser film is to redirect light in one direction, toward the next film. Employing diffuser films can provide up to 98% total light transmittance.

QUARTER WAVE RETARDER

This film offers uniform birefringence, increasing the wide angle view performance of the panel while keeping haziness low. Birefringence refers to the double refraction of light seen through a transparent material. This film works to provide a uniform view of the images on the LCD when being viewed from the left, right, top or bottom.

Industrial Repair



AGDisplays repairs most components on an LCD, so our customers don't have to replace whole units for minor repairs. Over years of finely-tuning our in-house manufacturing processes, we provide a smooth transition from modification, to inspection, to shipping. All repairs are performed at our US-based headquarters in Greensburg, PA.

AGDisplays is focused on refurbishing and repairing your LCDs; we specialize in providing cost-effective alternatives to LCD replacements. Located in Greensburg, Pennsylvania, our 124,000 square foot facility utilizes our multiple production lines and class 1,000+ clean rooms to perform precise modification and improvement procedures. For quality assurance measures, we perform a full diagnostic analysis for each repaired unit before sending restored LCDs back to customers.

With 40+ years of experience, AGDisplays trains our individuals through a stringent curriculum in which we evaluate regularly. If your unit has gone end of life (EOL), AGDisplays offers you access to our list of trusted LCD distributors. We also provide repair warranty services for panels that are no longer under OEM warranty.



BENEFITS

- ✓ **Access our line of trusted LCD distributors. Distributors are audited for quality assurance.**
- ✓ **Keep maintenance costs down without compromising quality of units.**
- ✓ **Access end of life (EOL) panels that are out of reach for others.**
- ✓ **Warranty program for products that are no longer under OEM warranty.**
- ✓ **Competitive and flexible pricing, including value add upgrades**
- ✓ **Full diagnostic analysis performed on each repaired unit**

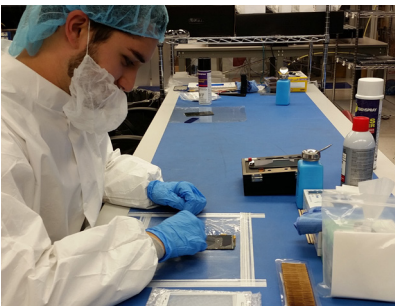
Thank You



COMMUNITY OF EXPERTS

Whether we are met with a new design or challenged with improving an existing design, AGDisplays supports your team by delivering unparalleled LCD expertise and technology. AGD partners benefit from our efficient design process and our dedication to creating quality design solutions.

We saw the need for off the shelf products, so we've added an expansive line of open/closed frame LCDs, digital signage, and all-in-one products. We offer unique LCD products like advanced touchscreen tabletops, high quality medical displays and rugged mobile devices. All of which are eligible for value add integration services. Our products are used across many industries including Military, Avionics, Marine, Industrial, Medical, Transportation and many more.



CERTIFICATIONS

AGDisplays values high-quality working and design standards. We support your teams with the knowledge & expertise needed to make the strategic design and manufacturing decisions.



CERTIFICATED PART 145
REPAIR STATION



AGDISPLAYS IS
ISO 14001, 45001 & R2
CERTIFIED

CONTACT US

HEADQUARTERS

AGDisplays, a dba of AssetGenie, Inc.
220 Huff Ave, Suite 400
Greensburg, PA 15601

CONTACT BY PHONE

Toll Free: 844-841-6851
Office: 724-552-4904
Fax: 724-552-4905

CONTACT BY EMAIL

sales@agdisplays.com
info@agdisplays.com
support@agdisplays.com

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