

What's your  
*light management*  
problem?



4000 POINT STREET • HOLTSVILLE, NY 11742

800.739.9063 • 631.447.7700

[www.metavac.com](http://www.metavac.com)



*Managing light to realize your vision.*

Part of Thermo Fisher Scientific



## Metavac. We solve light management problems.

Metavac has been manufacturing and developing thin film optical and electro-optical products since 1945. But that hardly describes who we are or what we really do. We don't have standard products in the traditional sense. There's no Metavac catalog to thumb through. So our customers don't buy Metavac solutions off the shelf. What they typically do is come to us with a problem. It could be color variance in an air traffic control display, or the danger of display failure in a military ground vehicle. Or even that biologically active molecules don't adhere well to glass microscope slides. The problem possibilities are almost endless.

Once we've wrapped our collective minds around the problem, we go to work, applying our expertise in materials interaction, coating process technology and light management. But it's more than just expertise that makes Metavac different. It's an innovative mindset. A way of looking at problems through a filter of non-conventional thinking. Seeing the full spectrum of possibilities and permutations, and arriving at just the right combination. To produce unique solutions that often exceed specifications—and expectations.

What's your light management problem? The pages that follow will give you an overview of the kinds of problems we've solved for our customers. We'd like the opportunity to do the same for you.

*It's more than just expertise that  
makes Metavac different.*

Metavac thin film solutions have benefited customers in diverse fields, including commercial and industrial, military, medical and life sciences. Here are just a few illustrative examples of the kinds of products and platforms made better by Metavac.

## Covering the light management spectrum.

### Ruggedized Display Shields

Major commercial, industrial and military manufacturers have come to rely on Metavac for solutions that combine cost-effectiveness with competitive advantage. Vandal-proof displays are only one example—other applications include command & control, security cameras and air traffic control displays.

### Diagnostic Micro-Arrays

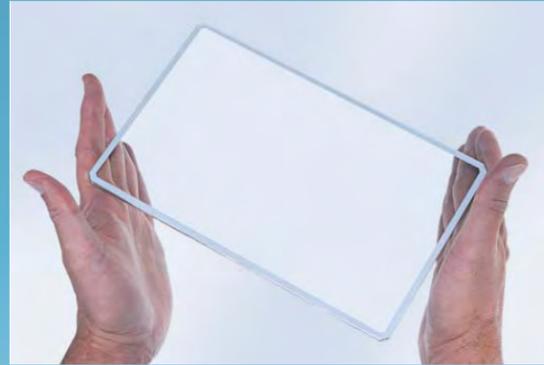
For the laboratory as well as the operating room, Metavac specialty coatings have proven to be not just innovative, but life-saving. Applications include laboratory glass micro-arrays and neutral color, anti-reflection coatings for endoscopes and laparoscopes.

### Transparent Heater Panels Night Vision-Compatible Filters

Metavac has developed vital components for thousands of military platforms used around the world, from LCD heater panels for fire control systems, to night vision compatible filters for avionics and covert lighting. When the application is mission-critical, the military's "go-to" partner is Metavac.

*When the application is mission-critical,  
the "go-to" partner is Metavac.*





- Uncompromised viewability from any angle.
- Most effective EMI/RFI shielding available.
- Proven ballistic integrity.
- Particulate/temperature/moisture protection.



*Metavac's Ruggedized Display Shields have military as well as commercial applications, such as vandal shields for ATMs and security cameras.*

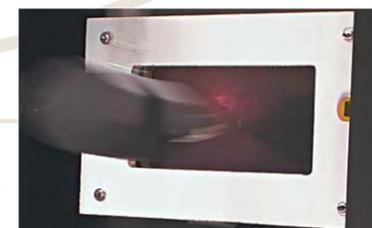
## High transmission, low reflectance—and bulletproof to boot.

How many kicks could your laptop take? Could it stand up to a week at the bottom of Death Valley, or an afternoon on an ice shelf in Antarctica? That's essentially what's required of the flat panel displays aboard the M1A2 Battle Tank. To meet the "can't fail" demands of these vehicles, Metavac's task was formidable: To shield these displays from the harshest battlefield conditions. Contain any potential electromagnetic and radio frequency interference. Ensure transmission in excess of 95%. And keep reflectance under 0.5% at up to a 60° viewing angle. On top of all that, these sensitive displays and electronics had to be able to withstand soldiers' inevitable boot kicks (at more than 1,000 pounds of force per kick), day after day after day.

The result? The Metavac Ruggedized Display Shield.



*Conventional displays are easily shattered in our boot kick test.*



*Metavac's Ruggedized Display takes repeated pounding without damage.*



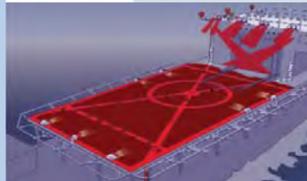
PERCENT REFLECTANCE

WAVELENGTH (nm)

Think about an aircraft carrier in a night-time combat situation. Aircraft need to be able to come and go freely, but they're not about to light up the ship like an airport runway, for obvious reasons. Metavac's night vision-compatible products allow pilots and crews to see—while staying unseen—in low-light and no-light conditions. From covert lighting solutions to night vision systems for Homeland Security applications, Metavac solutions let you see through darkness, smoke, fog or dust. And help ensure mission safety and success.



## Seeing the unseen.



Metavac's covert lighting solutions enable pilots to clearly see an otherwise-unlit flight deck—and also allow ground crews to see incoming aircraft.



Our Night Vision Imaging Systems (NVIS) filters eliminate the infrared associated with display illumination to make cockpit displays compatible with Night Vision Goggles (NVG). Introduced for military use, the commercial demand for our NVIS solutions is increasing as NVG use becomes more and more common in civilian aviation.



For observation and surveillance. Targeting and tracking. Thermal pointing and imaging. Metavac thin film solutions are now being used in Homeland Security applications, to protect and secure vital domestic installations.



Under combat conditions, you can't wait for the dust to settle. A Metavac coated optical element, part of a terrain analysis and visualization system mounted on the underside of a helicopter, maps the topography as the vehicle descends. The data is digitized and fed to avionics, which uses the mapping information to land the helicopter—despite the brown-out effect of the prop wash.



Liquid crystal display (LCD) screens offer a number of advantages compared to traditional CRT screens: they're smaller, weigh less, are more reliable and consume less power. But they do have one drawback, temperature sensitivity. When exposed to extreme cold, the liquid crystal ceases to flow. Which means the screen ceases to operate—until it warms up. In most everyday uses, that wouldn't present a terribly crucial problem. But in more critical applications, such as jet fighter displays or outdoor industrial monitoring, "instant-on" requirements call for a Metavac innovation: Transparent LCD Heater Panels.

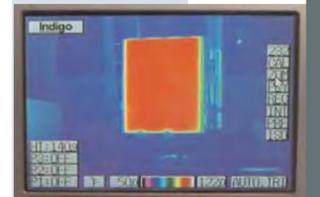
Designed to match the specific power requirements of a given platform, Metavac high-performance Transparent Heater Panels are bonded to LCDs, enabling them to function in the most frigid environments, delivering the reliability and performance your display systems demand.

## A nice warm coating for LCDs.

Using precisely-controlled thin film layers as the transparent conductive medium, Metavac Transparent Heater Panels give LCDs "instant-on" capability in the coldest temperatures.

Every Metavac Transparent Heater Panel is factory tested to ensure uniform heating over the entire surface of the display.

Depending on your requirements, Metavac Transparent Heater Panels are available with conventional leads or flat leads, or with bus bar connections. The uniformly ultra-thin bus bars and lead connections of every Metavac Transparent Heater Panel are engineered to be fully compatible with your LCD bonding and laminating processes.



We're accustomed to challenges at Metavac; in fact, most of our solutions began with a problem no one else could solve. But we were recently presented with a challenge that demanded we push the limits in nearly every category: an 8" x 20" panoramic projection liquid crystal display for the F-35 Joint Strike Fighter. The specifications for this, the world's most advanced tactical display, laid out a unique and complicated combination of characteristics and capabilities. High transmission and low reflectance. Touch sensitivity and fingerprint resistance. It had to be EMI/RFI shielded and night vision-compatible, with unprecedented edge-to-edge coating uniformity. And it needed to be more than just ruggedized. This display had to maintain structural integrity over its entire span, withstanding the multiple G forces to which the F-35 would be subjected.

It was no small task, but Metavac rose to the occasion. It meant creating specialized hybrid coatings and applying them to this unusually large display panel—the single piece of extraordinarily high-performance glass that makes the Joint Strike Fighter's tactical systems work.

## Pushing the envelope.

Specialized hybrid coatings give the Joint Strike Fighter's display an unheard-of combination of characteristics, ranging from night vision-compatibility to EMI/RFI shielding to touch sensitivity.

The Joint Strike Fighter is a joint, multinational program for the Air Force, Navy, Marine Corps, and eight international partners. The stealth, supersonic F-35 will replace a wide range of aircraft for the U.S. and allied defense forces worldwide.

*Most of our solutions began with a problem no one else could solve.*



The F-35's cockpit features the large eight-inch by twenty-inch color display that provides both tactical information and aircraft system data. Advanced projection engine architecture, video and compression technology, illumination module controls and processing memory make the Multi-Function Display System (MFDS) the most sophisticated tactical display in the world.



Medicine and life sciences bring a completely unique set of challenges. How can you improve light transmission of microscope slides? Can specimen cross-contamination be controlled? Is there a way to decrease reflection in endoscopy? Or make biologically active molecules adhere better to glass slides? The answer to each of these questions—and many others—is Metavac thin film coatings. By providing tools to research, Metavac's enabling technology takes the clinician from diagnosis and treatment to identification and prevention.



## A whole array of solutions for life sciences.

### Laboratory glass micro-array

By identifying distinct properties that human cells emit, including each specific lightwave signature, Metavac's specialty coatings for laboratory glass micro-arrays make it possible to optically perform rapid, simultaneous and accurate diagnostic testing for hundreds of health anomalies, genetic disorders and even the effects of drugs.

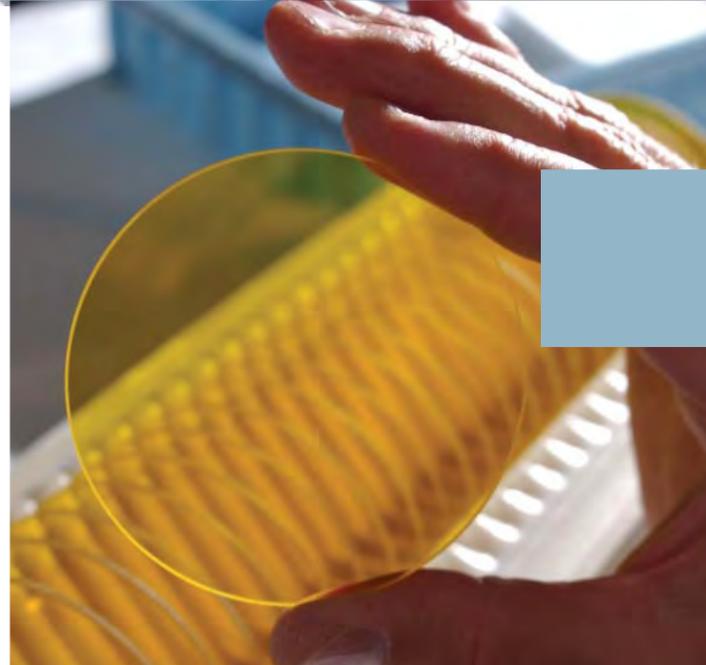
### Microscope slides and cover slips

Metavac thin film coatings can boost microscope slide and cover slip performance in a variety of ways. Improving light transmission. Controlling cross-contamination. Adding conductivity or heating capability. And more.

### Anti-reflection coatings

Minimally-invasive surgery, performed with endoscopes and laparoscopes, minimizes operative trauma and speeds recovery time, while maintaining an enhanced visual field for surgeons. But secondary reflections can interfere with light transmission and even cause ghost images. And lenses that favor one part of the color spectrum can impede diagnostic precision. Metavac's neutral balance, anti-reflection coatings decrease surface reflection while markedly improving image accuracy—enhancing detection and imaging, as well as analysis and diagnosis.

*Metavac delivers the reliability and performance  
your systems demand.*

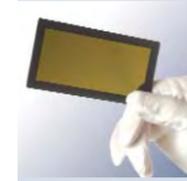
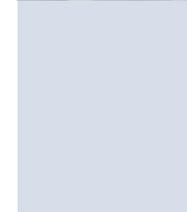


### Filter Glass

Metavac filter glass can transmit or absorb light in the ultraviolet (UV), visible and infrared (IR) spectrums. We can custom-formulate filter glass compositions to meet your specifications within the tight tolerances of the radiant spectrum. From circular polarizers that reduce specular reflectance to linear polarizers that reduce glare, Metavac custom filters can be manufactured to specific transmittance requirements and/or chromaticity coordinates.

### Contrast Enhancement Filters

By selectively transmitting the appropriate wavelengths, Metavac contrast enhancement filters enhance contrast and reduce glare, optimizing the readability of LED and CRT displays under adverse or high ambient light conditions—from daylight (4,000 foot-candles) to direct sunlight (10,000 foot-candles).



## Specialty coatings and enhancements.

### Hydrophobic Coatings

Our hydrophobic coatings bond with the glass, creating a barrier that repels dirt, dust, grease and liquid without optically changing the glass. This water-repellent coating is ideal for touch screens, and allows the glass to be cleaned with a dry cloth.

### Sparkle-free glass

The dramatic increase in display resolution brings with it new demand for high-performance glass, and even less tolerance for surface anomalies and the "sparkles" they cause. Metavac's sparkle-free glass delivers superior high resolution images across a range of contrasts, without lag, halo or artifacts.

### Non-conformal geometries.

Applying high-performance thin film coatings to a flat piece of glass is one thing. Thin film application on curved surfaces is quite another. But Metavac handles it with ease—even on the most challenging non-conformal geometries.





## We've got your light management solution.

Now that you've gotten a taste of what we can do, what we hope you'll take away from all this is that thin film engineering and applications may be the solution you've been looking for. And that the place to go for innovative thin film breakthroughs is Metavac.

We can help you, just like we've helped so many other customers over the past 60 years. And we'll start with this simple piece of advice: get us involved early. One of the biggest mistakes our customers have made is waiting until they're stuck on a problem to bring us in. It's much easier, and more productive, to call us at the beginning of your project. You'll save yourself a lot of time and money (and sleepless nights) by making us an integral part of your team from the outset. We'll even make one of our optical thin film engineers available to work the problem with you. There's a reason we talk about being involved "From Conception to Implementation." Simply put, it works.

Though the first use of thin films for optical purposes goes back to the early 1900s, this enabling technology is always new, always advancing. Demands and expectations are always increasing. So Metavac is always stepping up the pace. Pushing the limits of thin film performance. Finding new and better ways to solve your light management problems.

Metavac has your light management solution. Call us. You'll see.

*You'll save a lot of time and money by making us part of your team from the outset.*