



SAFETY AND SECURITY

Lumilux® for Document, Currency,
Brand Security, and Afterglow Applications

Honeywell Delivers Advanced Authentication Technologies to the World

Honeywell's Authentication Technologies business is a leader in fluorescent and phosphorescent pigments, dyes, and fibers in a wide variety of colors and particle sizes in addition to tailored detection solutions—for an impressive range of applications.

Our Lumilux® portfolio includes cutting-edge solutions for currency, government documents, brand protection, safety, and novelty applications, all reflecting our longstanding and advanced

expertise in security pigments and detection solutions.

Count on Lumilux pigments to deliver full-spectrum technology you can trust.



Competency

Honeywell's global authentication team has decades of experience in developing and manufacturing pigments, dyes, fibers and optical sensors. Our global resources, technical acumen, market knowledge, and commitment to continual product innovation—with 130 active authentication-related patents and ongoing investment in production capability—all contribute to the competency you expect from a global partner.



Reliability

Honeywell offers unique solutions for the most secure customer requirements as a result of our expertise in organic and inorganic luminescent product lines and detection solutions. Meeting commitments is one of Honeywell's key values. We are committed to meeting customer needs, including extensive product testing services, sampling logistics and reliable product support demonstrated by our work with Central Banks, Governments, and the Security Industry over the last 40 years. You can count on Honeywell to deliver for you.



Trust

At the core of our business promise is uncompromising quality and confidentiality. We understand the sensitive and imperative nature of your business. You can depend on the highest quality solutions and our utmost discretion.

Materials and Detectors for Security Applications

The Counterfeit Challenge

Today's counterfeiters are more sophisticated than ever before. No matter where you are in the world, addressing the threat is an enormous and ever-evolving challenge.

Everything from secure documents used for identification purposes—such as government-issued ID cards, driving licenses, passports, visas, and residence permits—to currency are under attack from counterfeiters.

Additionally, counterfeit and pirated products also put the health and safety of consumers worldwide at risk while robbing governments, businesses and communities of tax revenues, return on investment and legitimate jobs.

Document Security

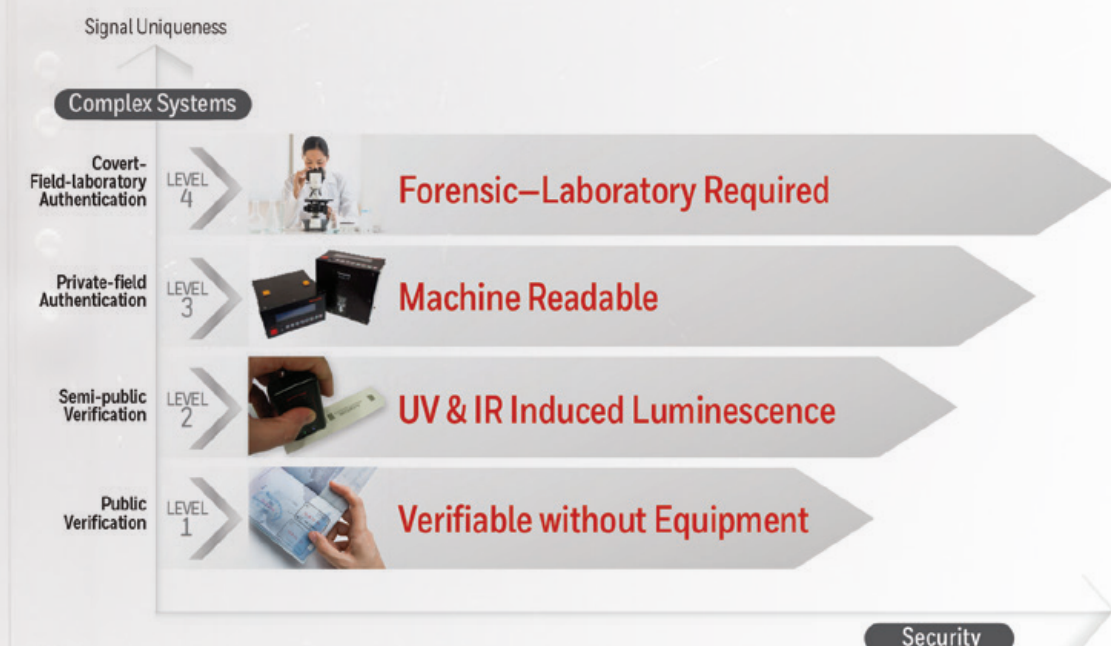
Governments and document printers need physical documents that cannot be copied. Honeywell solutions meet those needs and remain compliant with today's regulations.

Our increasingly sophisticated authentication technologies and protection methods feature printing and substrates which can be easily identified but are difficult to alter and duplicate.

Our technologies make detection more secure. Detection can vary in the degree of complexity and sophistication—from public verification using widely available lamps, to field inspector authentication using special-issued handheld sensors, to laboratory authentication using our advanced sensors.



Layers of Detection



Increase Your Confidence in the Security of Your Documents

Our product security specialists can work with you to develop easy-to-implement, one-of-a-kind solutions that are extremely difficult for counterfeiters to copy or alter.

Currency Security

Consumers need confidence that, whether a transaction takes place at a large central bank, in an office, or across the counter at the corner market, the bank notes and coins they're using are the real thing, backed by the full faith and credit of the issuing government.

Stay steps ahead of the forgers by choosing Honeywell's secure lock-and-key solutions as the backbone of an effective anti-counterfeiting program.

Our security pigments are extremely difficult to reproduce due to the high level of technological skill and expertise needed to characterize and manufacture them. These materials can be integrated into nearly every facet of a bank note—inks, fibers, threads, paper, or polymer substrates—and into coins to create markings that counterfeiters simply can't match.

Honeywell has also developed a family of highly sensitive and sophisticated detectors to create true lock-and-key solutions for our customers. Our detectors integrate with bank note, coin sorting and process control equipment as well as production and field readers.

Authentication Solutions You Can Bank On

With customized quality control, process control, and high-speed detectors, Honeywell solutions will enable you to create bank notes and coins that are easy to authenticate but practically impossible to counterfeit.



Brand Protection

Stakeholders need easy-to-use authentication solutions that prove products are legitimate—not fakes—and will meet the brand's performance promises.

Honeywell's security pigments can provide that assurance. Pigments can be applied onto products, or embedded in products (e.g., plastic, fabric or metal), or can be integrated into labels or packaging. Each approach allows for easy recognition by retailers and simple field authentication by brand owners or law enforcement.

Our Ultraviolet (UV) activated and Upconverting (UC) pigments can be seen with widely available UV lamps and Infrared (IR) handheld laser pens. To discriminate from standard UV and UC materials and provide a higher level of security, Honeywell offers machine readable UV and UC solutions. Our detectors are easy-to-use handheld readers or in-line detectors for your production.

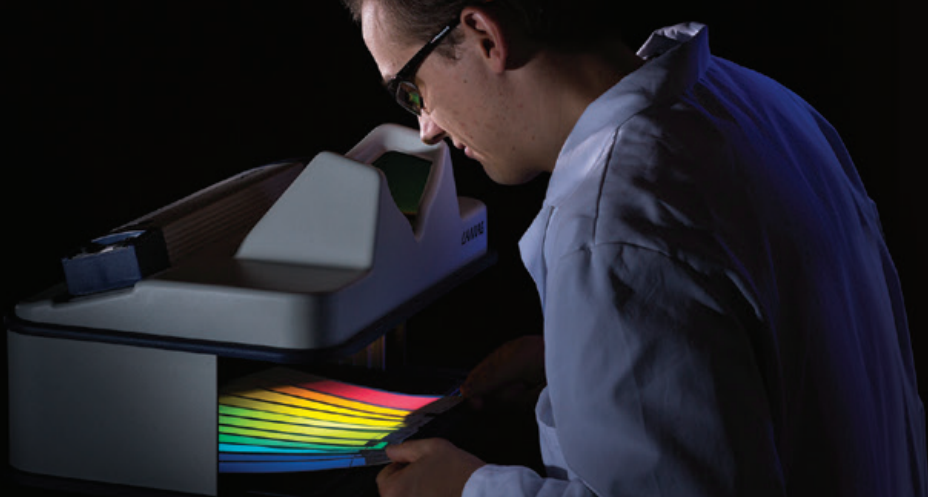
Get Cost-Effective Brand Protection

From healthcare and food products, to electronics and automotive parts, to sporting goods and apparel—in fact, anywhere counterfeiters believe a brand has created a gap between the market price and the cost of counterfeit production—Honeywell can offer brand protection and give your stakeholders confidence in your products.



The Lumilux® Portfolio for Security Applications

Honeywell has a broad range of products and know-how, developed over decades working with luminescent materials and authentication across the globe. When you work with Honeywell, you get access to the largest and most diverse portfolio of luminescent pigments and dyes in the industry.



Lumilux Pigments and Dyes

Honeywell offers the broadest range of fluorescent and after-glowing materials in the world, covering a significant range of excitation wavelengths from UV to IR. A variety of blue, green, yellow, orange, and red colors make it easy to match different application requirements.

- **Inorganic fluorescent particles.** Many can be excited by ultraviolet (UV) light and typically emit visible or invisible infrared (IR) light. Others (called upconverters) can be excited by IR light to emit in the visible. Inorganic particles can be incorporated in both inks and paper. They are also particularly resistant to high temperature processes such as plastics extrusion and lamination.
- **Organic fluorescent pigments and dyes.** Generally, they have low specific gravity and very good brightness. They have been applied for many years in conventional inks, such as offset and intaglio. Selected organic pigments perform well in lamination processes.

Certain fluorescent pigments and dyes have spectrally-narrow, bright light emission that can be used for effective machine detection. Such line emitters can be used with proprietary detectors to discriminate them from conventional UV materials for enhanced security.

Our fluorescent dyes and pigments can be suitable for inkjet inks and printing processes for product coding and for personalization of high security documents.

Our after-glowing pigments are available in a variety of colors and particle sizes.

Lumilux Fibers

Adding luminescent fibers to paper creates an effect that is very difficult to copy. Fibers are added at the mill where the paper is produced.

Honeywell can provide nearly 40 different types of fluorescent fibers offering a selection of colors and substrates, including:

- Polyamide
- Viscose
- Other polymeric fibers upon request.

Cutting lengths typically range from 3 to 6 mm with fiber size from 3.3 to 28 dtex. UV-excited emission colors include blue, green, yellow, orange, and red and can be combined with an upconverter. Daylight appearance can range from colorless to brightly colored.

High-Security Solutions

The most complex and critical applications typically use a combination of security features and need multiple detection methods. Honeywell has created many customized lock-and-key solutions with varying levels of security.

Whatever the approach, Honeywell can help you work through the exact combination you need for the application, including all the necessary taggants and detection hardware. Our deep knowledge and experience will help you find the best approach to make counterfeits practically impossible.

Detection Systems

Detection can be set up in one or more of the following ways:

- For semi-covert solutions, IR and UV light sources can be used to allow observation and recognition with the human eye in the visible spectrum.
- For line emitters, the emission signal can be machine read in the following formats:
 - Field use handheld with a simple yes/no response
 - Production process control units
 - Laboratory quality control units
 - Other custom formats (e.g., high-speed readers, or fielded stationary units)

We offer detection solutions for high-speed environments (used in high speed sorting of banknotes, for example) but can also support low speed or static conditions with the right sensor technology.



Materials for Safety and Novelty Applications

Visual afterglow can show the way to safety and also be a distinctive, intriguing, and useful product feature. Materials that give off light in the dark without the need for electrical power enable unique applications and effects.

Honeywell sells competitively-priced powders and master batches that allow product formulators to innovate in the market, and we provide assurances for product and supply chain reliability.

Applications range from lighting for exits, aisles, and stairwells, to safety gear and equipment handles, to toys and distinctive and useful shoes, apparel, and outdoor gear. Colors include green, blue, and red, with afterglow time up to multiple hours. Honeywell offers various fluorescent pigments for artificial teeth.

Stand Out in the Market

From safety visibility to visual attractiveness, Honeywell can help you improve the performance of your products.



Partner with Honeywell

For more than 40 years, Honeywell has helped customers meet their needs with covert luminescent materials and optoelectronic detection systems. Our chemical products have a long heritage, going back more than a century to Riedel-de-Haen®, a pioneer in

luminescent materials. Today the group has sales and customer support locations around the world, with ISO 9001 certified and black belt supported manufacturing in Seelze, Germany.



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For more information

To learn more about Honeywell Authentication Technologies, contact your account manager or visit www.honeywell-authentication.com.

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