CHROMA

TOPPAN
TOPPAN Security

CHROMA: THE TECHNOLOGY OF THE DECADE

The world's first colour laser technology, delivering lifelike, high-definition portraits with unrivalled smoothness on polycarbonate identity cards and passport data pages

Data Sheet

Understanding the Technology Behind CHROMA

CHROMA is a breakthrough in secure identity personalisation, enabling high-definition, full-colour portraits laser-engraved directly into the polycarbonate substrate. A high-definition, realistic portrait in 100% colour laser technology is not something the market was able to achieve until now. Developed by TOPPAN Security, CHROMA addresses the limitations of traditional greyscale laser engraving and inkjet printing, offering a new standard for document security and visual authenticity. By embedding colour within the document structure, CHROMA ensures durability, authenticity, and compliance with international standards. We achieve a portrait up to 1200 DPI equivalent with unparalleled smoothness that is tamper-proof, setting a new benchmark for secure identity documents.

Photographs of real CHROMA samples

How It Works

CHROMA operates through a single laser source that engraves three colours, cyan, magenta, and yellow to create polychromatic images in a CHROMA-reactive material that is embedded within the polycarbonate material. This material, made from polycarbonate resin, is integrated during the lamination process. Portraits are created using a subtractive colour model, fine-tuning laser parameters to enable the reproduction of up to 16.7 million colours. This process ensures accurate skin tones, smooth gradients, and vibrant images. The personalized image is embedded into the document and requires no additional consumables to protect the engraving.

Technical Specifications

CHROMA achieves an effective resolution equivalent to 1200 DPI through precise laser overlap and intensity modulation, delivering exceptional image clarity. Unlike inkjet printing, the colour image is embedded below the document surface, making it highly resistant to abrasion, tampering, and environmental degradation. This sub-surfaced approach ensures that the portrait remains vibrant and secure throughout the document's lifespan. The final thickness of the data page remains consistent with standard polycarbonate specifications. CHROMA complies with ICAO portrait standards and has passed testing for durability and security.

Integration Details

The CHROMA material is applied during lamination, requiring no special handling after production. It is compatible with polycarbonate substrates from multiple manufacturers and has been tested for strong resistance to delamination.

The engraving time with CHROMA is comparable to greyscale laser personalisation. The feature has been tested beyond ICAO's 10-year lifecycle requirements, demonstrating exceptional durability under harsh conditions.

Usage with Standard Security Features

CHROMA offers tamper resistance by embedding personalisation beneath the surface, making peeling or alteration virtually impossible. Authentication is supported by a unique micro-line structure visible under 15× magnification, providing level-two forensic security. The technology is fully compatible with DOVIDs, UV printing, RFID chips, and tactile elements, ensuring comprehensive protection.