

MB COLOR FAMILY

PRODUCT OVERVIEW



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MÜHLBAUER GROUP AT A GLANCE

MÜHLBAUER'S BUSINESS UNITS AND SITES

Founded in 1981 in the heart of Bavaria, the Mühlbauer Group has ever since grown to a leading global player in the fields of Parts & Systems, Semiconductor Related Products, Document Solution Related Products and TECURITY® Solutions. With around 3,500 employees, technology centers in Germany, Malaysia, Slovakia, the U.S.A. and Serbia and 35 sales and service locations worldwide, Mühlbauer created a strong competence network around the globe.

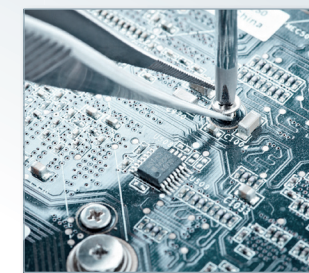
We continuously invest in the latest technologies and innovative processes to enhance our competences and provide you with optimized solutions. Our in-house precision part production MPS – Mühlbauer Parts & Systems – guarantees unlimited flexibility and highest customer satisfaction.

Our business unit AUTOMATION does not only develop and assemble individually customized production systems, but also provides matching software solutions for the production process of Document and Solution Related Products. Vision inspection technologies as well as semiconductor and RFID applications complete our comprehensive portfolio.

Our business unit TECURITY® is established as a competent partner for the implementation of security systems for identifying and verifying both documents and individuals. Our clients benefit from more than three decades experiential value which we have gained during the realization of over 300 ID projects worldwide.



MPS
Precision Parts & Surface Engineering



AUTOMATION
Production Equipment & Systems



WORLD OF TECURITY®
Government & Technology Solutions



MB ALFRESCO® PICTURE

HIGH-SECURE COLOR PICTURE PERSONALIZATION

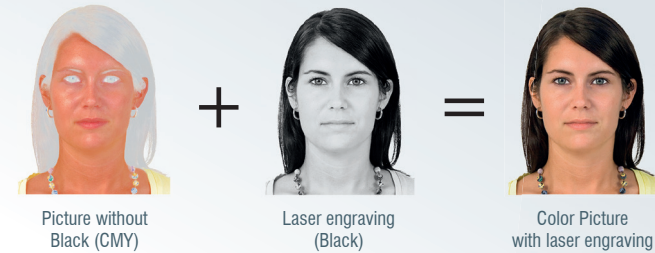
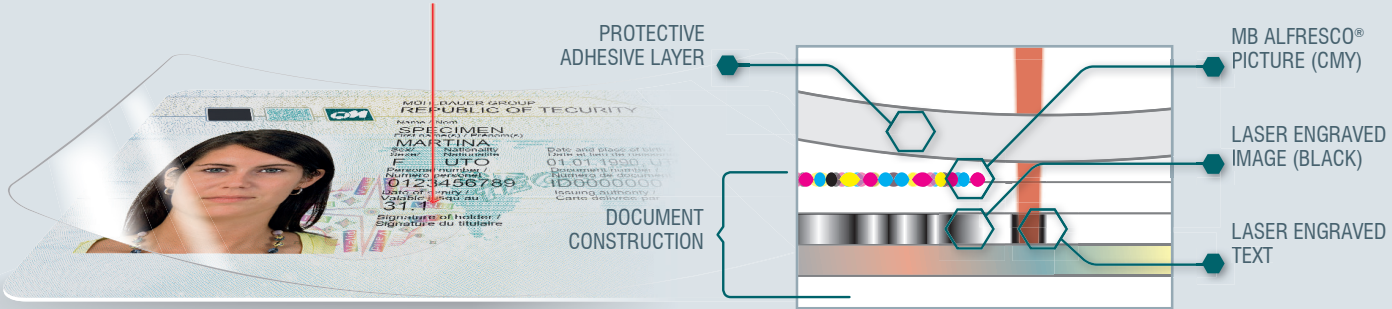
The sophisticated MB ALFRESCO® PICTURE technology smartly combines color picture personalization with laser engraving. To achieve the high-secure personalization result, the image of the holder is split into two parts using special image processing algorithms. The converting process transfers all picture information, which describe the details (forensic information), into a greyscale image. This greyscale information containing all contrast information of the picture is engraved into the inner layers of the document by using laser engraving technology. The remaining color parts are converted to a separate color image, which is then printed on the blank document's surface. Due to the special characteristics of the ink, the colors penetrate the card surface, thus thwarting counterfeiting attempts of scratching off the surface. The final result is a high resolution color picture, which shows

utmost details. This picture technology has the same long lasting durability characteristics and resolution as a pure laser engraved picture. Since the color part of the photo is printed on the document surface, however, it has to be additionally protected by an adhesive layer due to durability reasons. Attempts to remove the photo are protected as the greyscale information remains inside the document. The greyscale picture can be additionally verified under IR light. Due to the special color properties of the MB ALFRESCO® PICTURE, optical variable features (e.g. Holograms) shine through the color picture and protect it thereby against replication by photo copying. The highest level of security is reached by laser engraving the biographical data and a secondary holder's portrait into the document material. The technology is suitable for a decentralized as well as a centralized personalization concept.



FACTS & FIGURES

- Applications: High-secure cards, identity cards, Driver's License, polycarbonate passport datapages
- Durability: 10+ years ¹⁾
- Resolution: up to 1440 dpi
- Document Material: PC, PVC, other materials available on request
- Consumables: MB ALFRESCO® inks, protective layer
- Central security aspect: personalization on different layers of document
- Personalization infrastructure: centralized & decentralized



¹⁾ Depending on normal use conditions and used protective layer

MB ALFRESCO® PICTURE & LIQUID COATING

LATEST DEVELOPMENTS IN LASER & COLOR PRINTING

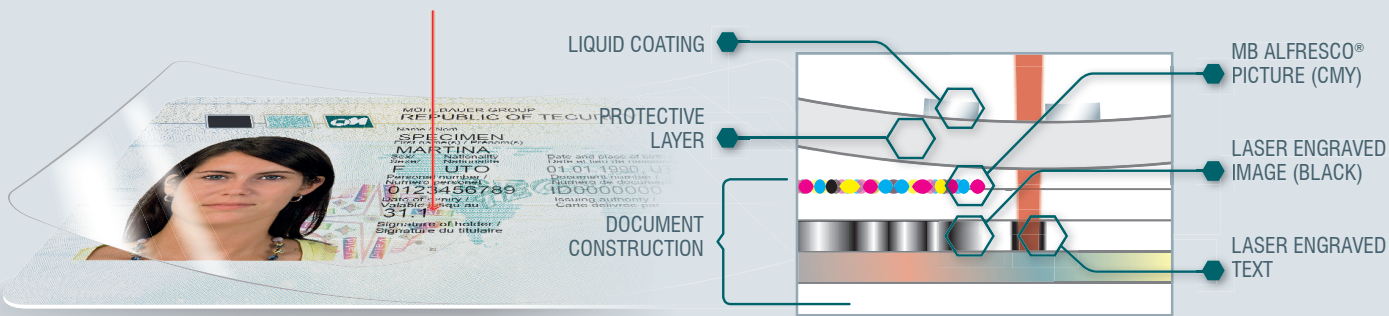
Mühlbauer's latest development in the area of laser and color printing for ID documents is a sophisticated combination of MB Alfresco® Picture and a special varnish technology called "Liquid Coating" which helps to extend the holder image's lifetime to more than 10 years. This in-house developed application, which is already added during the printing process, guarantees that high-quality security and design features such as personalization, watermark, relief, UV or forensic markers can individually be added – without limiting the existing technologies and features (like CLI, UV print) and without additional costs. Furthermore, the

"Liquid Coating" serves as a protective layer which additionally increases the ID document's counterfeit increases the counterfeit protection even more. By using special translucent inks, even embedded holograms remain visible "through" the picture. If the laser technology is not required for the picture and only used for textual and other laser features (e.g. CLI or MLI), high throughputs of 6000+ UPH can be achieved. The bottle neck, however, is the lasertime of the picture's black-and-white parts where up to 8 parallel laser systems offer a speed of up to 2000+ UPH.



FACTS & FIGURES

- Applications: High-secure cards, identity cards, Driver's License, polycarbonate passport datapages
- Durability: 10+ years ¹⁾
- Resolution: up to 1440 dpi
- Document Material: PC, PVC, other materials available on request
- Design: a multitude of shapes & styles is available
- Liquid Coating is not limited to the picture area on the holder page
- It can be done in one single personalization system from high to low volume



LIFETIME OF MORE THAN 10 YEARS ¹⁾

HIGH RESOLUTION COLOR PICTURE (1440 DPI)

MB ALFRESCO® PICTURE COMBINED PRINT & LASER ENGRAVING PERSONALIZATION

HIGHEST DURABILITY

PERFECT LIGHT FASTNESS

- MB ALFRESCO® PICTURE
- LIQUID COATING PATCH
- MB EMBEDDED PICTURE



Liquid Coating – Entire Area



Liquid Coating – Relief



Liquid Coating – Outline & UV



MB EMBEDDED PICTURE

COLOR PICTURE INSIDE CARD BODY

Conventional color picture personalization technologies which are commonly used, have their limitations in durability – especially as far as light fastness is concerned. Furthermore, the colored photo, which is situated on top of the document's surface, which might be susceptible to manipulation of the photo. For that very reason, Mühlbauer has developed the next generation of color photo technology: Due to the long-term experience with its in-house pro-

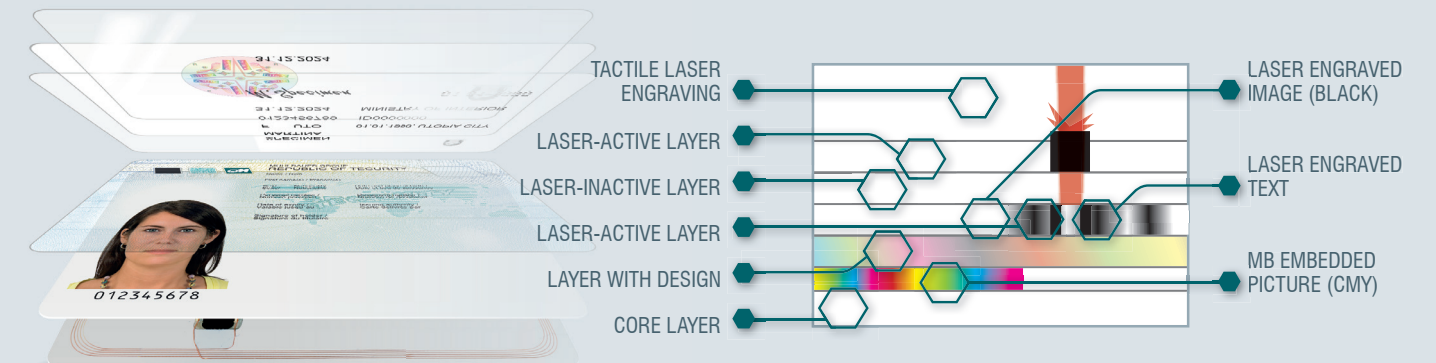
duced equipment, Mühlbauer's expertise with the document production and personalization process is outstanding. Based on this, the well-proven document production workflow was extended by an additional pre-personalization process step before the different polycarbonate layers are collated and laminated together. With this approach the color image is irreversibly incorporated in the document body which guarantees the highest level of security.

STANDARD INDUSTRIAL PRODUCTION FLOW: CONTROLLED BY PRODUCTION MANAGEMENT SYSTEM MB INCAP



FACTS & FIGURES

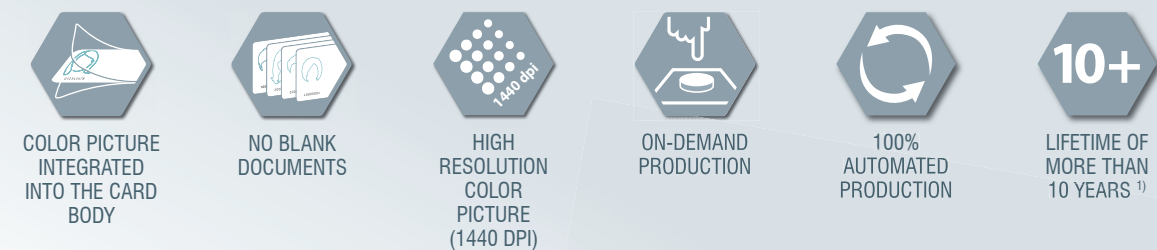
- Applications: high-secure cards, identity cards, Driver's License, polycarbonate passport datapages
- Durability: 10+ years ^{1) 2)}
- Resolution: up to 1440 dpi: easy detection of forgery, automated verification
- Document Material: PC, PVC, other materials on request
- Consumables: MB Embedded Picture ink
- Central security aspect: no blank documents, personalization on different layers of document
- Personalization infrastructure: centralized with accompanied document production



MB ALFRESCO® PICTURE

LIQUID COATING PATCH

MB EMBEDDED PICTURE



¹⁾ Depending on normal use conditions
²⁾ Depending on used card material



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