MB COLOR FAMILY

PRODUCT OVERVIEW

MB COLOR FAMILY

UNIQUE & SMART SECURITY CONCEPT

The main target of a smart security concept is to reach the highest document security level possible. It enables our clients and related authorities to quickly discover trials of fraud. During investigation of the ID document, government officers shall be able to verify a manipulated document on the 1st and / or 2nd security level.

Generally speaking, the security concept of the issued ID document can be divided in two parts. Firstly, the blank ID document, which is not yet personalized but is already equipped with a forgery-proof security design and security elements which protect the document against copying and imitation. Secondly, additional security features which are applied during the personalization process to protect the individual information against forgery. In a sophisticated security concept, the blank document features and personalized security elements closely interact and together form a high-secure document.

With our MB COLOR FAMILY, the smart security concept is extended by various features which enable our clients or the relevant authority to easily conduct an automated and reliable verification by means of standardized reader systems.

HIGH-SECURE PICTURE PERSONALIZATION OF ID DOCUMENTS

The photo on the personalized identity card is the main visual identifier of the document's holder. It is of utmost importance to present this main identifier in a perfect quality and to apply suitable protection against counterfeit attempts to change or manipulate the picture. Another main influence factor of the document specification is the service lifetime for the entire identity document in general and for the document's picture in particular.

The launch of the greyscale-laser engraving technology on polycarbonate documents marked a breakthrough for the personalization of identity documents. During this process, the holder's black-and-white portrait is laser-engraved inside the multi-layered polycarbonate document structure and thereby protected against any kind of manipulation or substitution. This greyscale-laser technology allows for the engraving of high-resolution pictures while at the same time keeping all the original picture details. Thus, a perfect cardholder authentication, a high durability, as well as a secure protection of the image against any kind of manipulation or substitution are ensured. For this

very reason, the greyscale-laser engraving technology is the preferred choice in different forensic committees around the world.

An identity project, however, must not only fulfill highest security and durability demands, but also needs to gain the general public's acceptance. In spite of the fact that greyscale-laser processes have become very well established, this technology has yet failed to reach the same level of acceptance in the general public as color personalization. In this context, many authorities hold the opinion that the implementation of greyscale images in identification documents means taking a step backwards in technology.

For this very reason, Mühlbauer has extended its comprehensive portfolio by the MB COLOR FAMILY, consisting of MB D2T2 PICTURE, MB ALFRESCO®, MB ALFRESCO® PLC, MB ALFRESCO® PPL and MB EMBEDDED PICTURE. These different technologies are designed to meet the various demands for identification documents with regard to quality, cost-efficiency and durability.

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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.

Service Hub Russia
HQ Germany
Production Center Germany
Production Center Slovakia
Production Center Bosnia & Herzegovina
Production Center Serbia
Service Hub Georgia
Service Hub South Korea
Service Hub Japan
Service Hub Spain
Service Hub Iraq
Production Center USA
Service Hub Turkey
Production Center China
Service Hub United Arab Emirates
Service Hub Taiwan
Service Hub India
Service Hub Mexico
Production Center Malaysia
Service Hub El Salvador
Service Hub Uganda
Service Hub South Africa
Service Hub Brazil
Service Hub Australia

Mühlbauer
Bosnia & Herzegovina

Mühlbauer
China

Mühlbauer
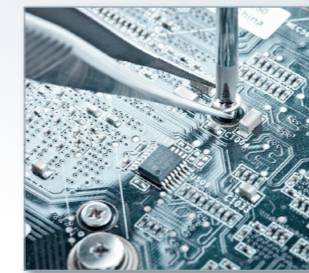Germany

Mühlbauer
Malaysia

Mühlbauer
Serbia

Mühlbauer
Slovakia

Mühlbauer
USA

MPS
Precision Parts & Surface Engineering

AUTOMATION
Production Equipment & Systems

WORLD OF TECURITY®
Government & Technology Solutions

MANUFACTURING EXECUTION SYSTEMS

MB MCES
PERSONALIZATION MANAGEMENT SYSTEM

MB MCES is a personalization management software, which integrates incoming data with product definitions and controls the associated physical and electrical personalization processes. MB MCES handles personalization data from a variety of different input methods and formats.

MB INCAPE
INTEGRATED PRODUCTION MANAGEMENT SOFTWARE

MB INCAPE is Mühlbauer's Production Management Software for the production and personalization of electronic cards and documents (e.g. ID cards, ePassports, Driver's Licenses, EMV or GSM cards). Combining data management, production control and material management, the system allows for highly automated processes. It processes customer- and application-specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.

MB PALAMAX®
TOTAL PROCESS TRANSPARENCY

MB PALAMAX®, Mühlbauer's Smart Factory solution, is developed for card, tag or booklet productions, personalization factories and semiconductor backend shop floors to set and collect process data to monitor and improve the efficiency of production and personalization for later processing, visualization and statistical analysis.

MB TOOL LEADER
CONNECTOR BETWEEN SYSTEMS

MB TOOL LEADER is a software package which consists of several applications and serves as a reliable link between the individual systems involved in the production process. By means of MB TOOL LEADER, the entire process chain – from the incoming order to the final precision part – can easily be monitored and controlled. This real-time machine monitoring guarantees an automated production process. Production errors can be detected and solved at an early stage. Thus, MB TOOL LEADER reduces the machine downtimes, which in turn leads to an increase of the machine's productivity by up to 20 percent.
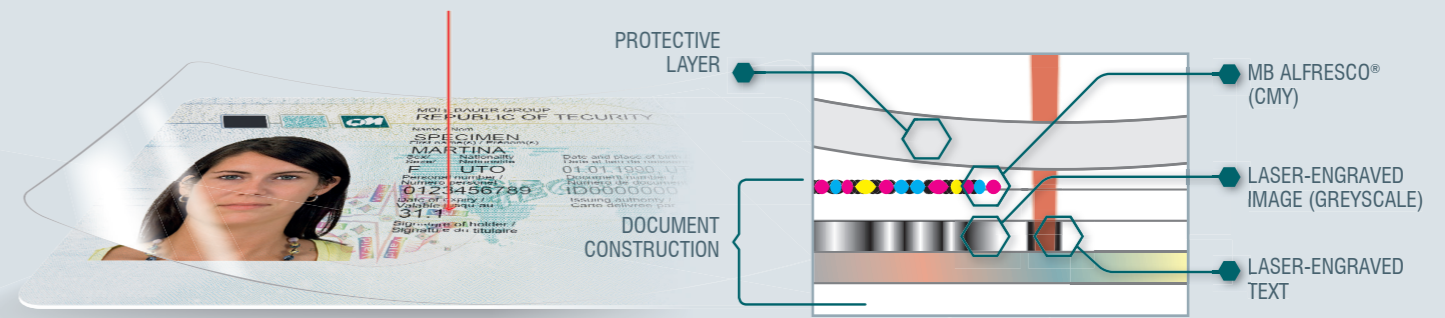
FEATURES & ADVANTAGES

- Configurable workflow steps regarding personalization, quality assurance & issuance
- Fully-automated processing & production management
- Scalability regarding different documents, machines & personalization locations
- Flawless integration of Mühlbauer's material management system (MB INCAPE WAREHOUSE)
- Connection to card / document management systems via web service, database, file-based interface
- Standard interface to personalization machines with integration of third-party machines possible
- Integration of MB USER MANAGEMENT
- Full coverage of production control requirements (security industry & EMV standards)

- Seamless connection to MB PALAMAX® & MB DATA PREPARATION
- Simplified administration due to web-based operator clients
- Monitoring of real-time performance of the production
- Seamless tracking of documents from point of production to issuance
- Statistical tool analyze collected data & deliver customized statistics on OEE
- Tool which enables the remote operation of machines on the shop floor from a control centre
- Tool which increases effectiveness & efficiency so that production becomes more profitable
- Enables production engineering to prepare & test a repeatable factory set-up. Factories can switch between products within minutes.

MB ALFRESCO®
FUSED PRINT & LASER PERSONALIZATION

Mühlbauer's sophisticated MB ALFRESCO® 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 by means of special image processing algorithms. The converting process transfers all picture information, which describe the details (forensic information), into a greyscale and a color image (without picture's black component). During the pre-personalization process, the greyscale information which contains all of the picture's contrast information is laser-engraved in the polycarbonate card body's inner layer with a resolution of up to 1.200 dpi. The picture's remaining color parts are converted to a separate color image and inkjet-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 ID document's surface.

The final result is a high-resolution color picture, which shows utmost details and has the same long-lasting durability charac-teristics (10+ years) as a pure laser-engraved picture. Since the color part of the photo is printed on the document surface, it has to be additionally protected by an adhesive layer due to durability reasons. Attempts to remove the photo are securely protected as the greyscale information always remains on an inside layer within the document body. The greyscale picture can additionally be verified under IR light. Due to MB ALFRESCO®'s special color properties, optical variable features (e.g. holograms) shine through the color picture and protect it thereby against replication by photo copying. Furthermore, according to ICAO recommendations, the background printing still remains visible through the color picture – a special feature which increases the document's security even more. The highest level of security is reached by laser engraving the biographical data and a secondary holder's portrait into the document material.

The MB ALFRESCO® technology is suitable for decentralized as well as for centralized personalization concepts.
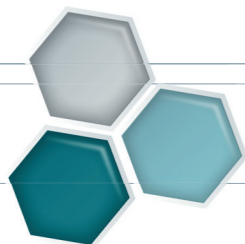
PROTECTIVE LAYER

MB ALFRESCO® (CMY)

LASER-ENGRAVED IMAGE (GREYSCALE)

DOCUMENT CONSTRUCTION

LASER-ENGRAVED TEXT

10+ LIFETIME OF MORE THAN 10 YEARS

HIGH-RESOLUTION COLOR PICTURE (UP TO 1.200 DPI)

MB ALFRESCO® PICTURE – COMBINED PRINT & LASER-ENGRAVING PERSONALIZATION

HIGHEST DURABILITY

PERFECT LIGHT FASTNESS

MB ALFRESCO®

MB ALFRESCO® PLC

MB ALFRESCO® PPL

MB EMBEDDED PICTURE

PRINTED PICTURE WITHOUT BLACK (CMY)

LASER-ENGRAVED PICTURE (BLACK)

MÜHLBAUER GROUP
REPUBLIC OF TECURITY
Name / Nom
SPECIMEN
First name(s) / Prénom(s)
MARTINA
Sex/ Nationality
Sexe/ Nationalité
F   UTO
Personal number/
Numéro personnel
0123456789
Date of expiry /
Valable jusqu'au
31.12.2024
Signature of holder /
Signature du titulaire
M.Specimen

Date and place of birth /
Date et lieu de naissance
01.01.1990, UTOPIA CITY
Document number /
Numéro de document
ID0C00000
Issuing authority /
Cave delivrée par
MINISTRY OF INTERIOR

LASER-ENGRAVED SECONDARY HOLDER PORTRAIT

LASER-ENGRAVED PERSONAL DATA

PICTURE WITHOUT BLACK (CMY)

LASER-ENGRAVING (BLACK)

COLOR PICTURE WITH LASER-ENGRAVING

FACTS & FIGURES

- Applications: high-secure cards, identity cards, Driver's License, polycarbonate passport datapages, others available on request
- Durability: 10+ years
- Resolution: up to 1.200 dpi
- Document Material: PC, PVC, other materials available on request
- Consumables: MB ALFRESCO® inks, protective layer
- Central security aspect: personalization on different document layers
- Personalization infrastructure: centralized & decentralized

MB ALFRESCO® PLC
PROTEC – LIQUID COATING

NEW

Since the color part of the photo is inkjet-printed on the document surface as part of the MB ALFRESCO® technology, the document holder's picture has to be secured by an additional protective layer. This layer can either be made of a special protective varnish called "Liquid Coating" or by means of a protective layer (partial, full-face or clear). As latest update of its MB COLOR FAMILY, Mühlbauer has extended its sophisticated combination of MB ALFRESCO® and

"Liquid Coating" to the additional security feature MB ALFRESCO® PLC (PROTEC – Liquid Coating). This innovation is supposed to increase the document's counterfeit protection even more. Furthermore, the "Liquid Coating" varnish can optionally be endowed with an individualized Data Transition Laser Imaging (DTLI) which is only visible under infrared light or ultraviolet light (see examples in graphics below).
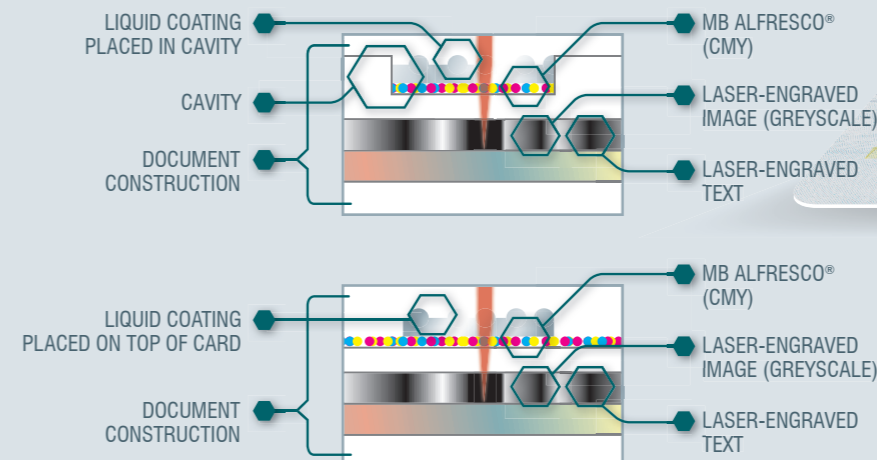
LIQUID COATING PLACED IN CAVITY

CAVITY

DOCUMENT CONSTRUCTION

MB ALFRESCO® (CMY)

LASER-ENGRAVED IMAGE (GREYSCALE)

LASER-ENGRAVED TEXT

LIQUID COATING PLACED ON TOP OF CARD

DOCUMENT CONSTRUCTION

MB ALFRESCO® (CMY)

LASER-ENGRAVED IMAGE (GREYSCALE)

LASER-ENGRAVED TEXT

MB ALFRESCO®

MB ALFRESCO® PLC

MB ALFRESCO® PPL

MB EMBEDDED PICTURE

IMAGE WITHOUT BLACK (CMY)

LIQUID COATING WITH INDIVIDUALIZED DTLI & UV PARTICLES

LASER-ENGRAVED IMAGE (BLACK)

FULL COLOR IMAGE

HIGH-RESOLUTION COLOR PICTURE (UP TO 1.200 DPI)

HIGHEST DURABILITY

LIQUID COATING PLACED ON TOP OF CARD

LIQUID COATING WITH DTLI

LASERED TEXT – DUE TO DTLI ONLY VISIBLE IN IR

10+

IR

LIFETIME OF MORE THAN 10 YEARS

MB ALFRESCO® PICTURE INFORMATION ON DIFFERENT LAYERS

PERFECT LIGHT FASTNESS

LIQUID COATING PLACED IN CAVITY

LIQUID COATING PLACED IN CAVITY WITH DTLI

IMAGE UNDER DAY LIGHT

IMAGE UNDER INFRARED LIGHT

VISUALIZATION OF DTLI UNDER UV LIGHT

FACTS & FIGURES

- Applications: high-secure cards, ID cards, Driver's License, polycarbonate passport datapages, others available on request
- Durability: 10+ years
- Resolution: up to 1.200 dpi
- Document Material: PC, PVC, other materials available on request
- Design of individualized Liquid Coating: a multitude of shapes & styles is available
- One single personalization system (scalable from high- to low-volume)
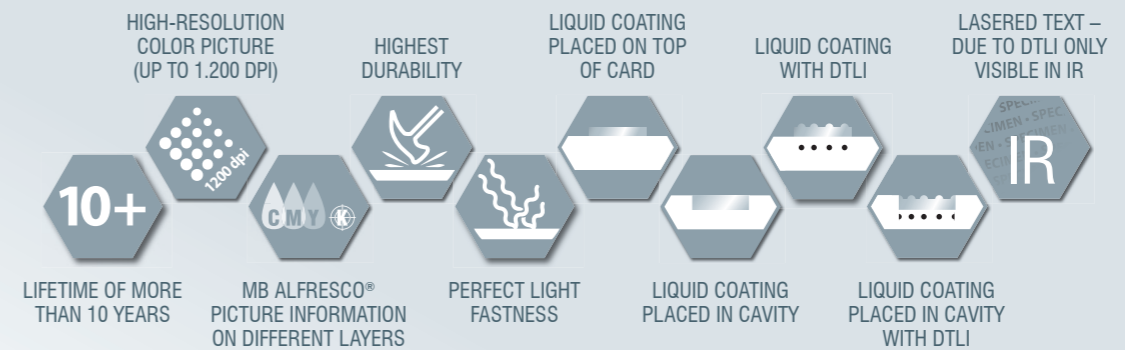
Liquid Coating – Tactile Relief

Full color image under IR light
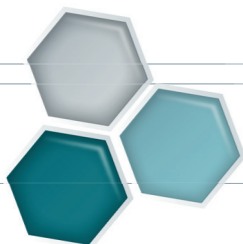
Liquid Coating – UV

1) CAVITY (OPTIONAL)
Already during the card body production process, a cavity is embossed into the card body. A high-resolution image is then inkjet-printed inside this cavity. Afterwards, the Liquid Coating varnish is also placed into this cavity. As a final step, the greyscale image is laser-engraved into one of the lower card body layers so that a brilliant full color image with a resolution of up to 1.200 dpi emerges.

2) IR LIGHT (OPTIONAL)
Both the high-resolution picture's greyscale and color parts reflect visible light; however, it is only the greyscale part of the optical sign which reflects infrared light. That is why the cardholder's individual information, which is additionally greyscale-lasered into the card body, is only visible under infrared light. In addition, the individualized Liquid Coating structure deflects the IR laser rays, so that an individual image / DTLI (in this case the lettering: "SPECIMEN") becomes visible.

3) UV LIGHT (OPTIONAL)
The Liquid Coating varnish can be pigmented with additional UV particles which luminesce under ultraviolet light. This security and design feature can individually be personalized. The individual cardholder information in Liquid Coating is visible only under ultraviolet light.
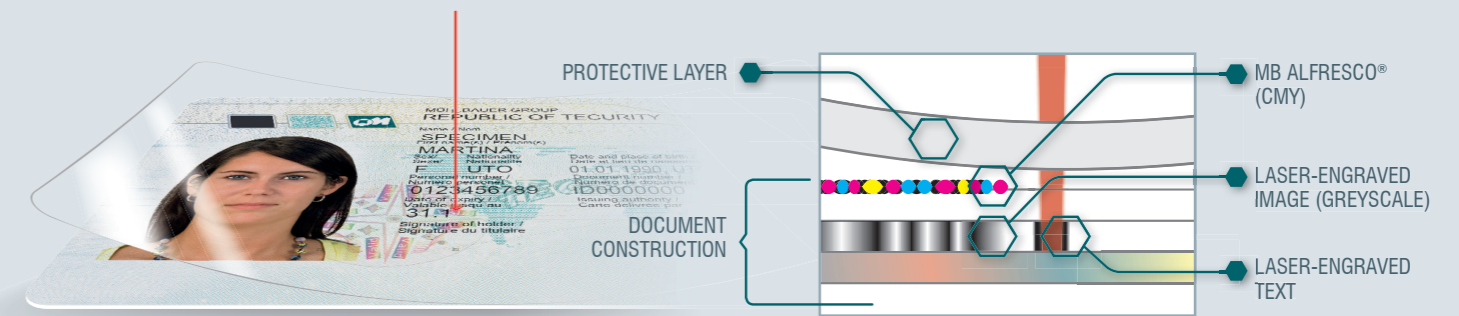
MB ALFRESCO® PPL

PROTEC – PROTECTIVE LAYER

Since the color part of the photo is inkjet-printed on the document surface as part of the MB ALFRESCO® technology, the document holder's picture has to be secured by an additional protective layer. This layer can either be made of a protective varnish (see MB AL-FRESCO® PLC) or by means of a protective layer (partial, full-face or clear) – this one-of-a-kind technology is called MB ALFRESCO® PPL (PROTEC – Protective Layer). In order to endow the document with additional security features, the protective layer can also be supplied with a hologram (transparent, fully metallized or partially metallized; only possible for partial and full-face protective layers).

PROTECTIVE LAYER

DOCUMENT CONSTRUCTION

MB ALFRESCO® (CMY)

LASER-ENGRAVED IMAGE (GREYSCALE)

LASER-ENGRAVED TEXT

MB ALFRESCO®

MB ALFRESCO® PLC

MB ALFRESCO® PPL

MB EMBEDDED PICTURE

PICTURE WITHOUT BLACK (CMY)

LASER-ENGRAVING (BLACK)

PROTECTIVE LAYER

COLOR PICTURE WITH LASER-ENGRA-VING & PROTECTIVE LAYER (PARTIAL)

10+
LIFETIME OF MORE THAN 10 YEARS

HIGH-RESOLUTION COLOR PICTURE (UP TO 1.200 DPI)

MB ALFRESCO® PICTURE COMBINED PRINT & LASER-ENGRAVING PERSONALIZATION

HIGHEST DURABILITY

PERFECT LIGHT FASTNESS

FACTS & FIGURES

- Applications: high-secure cards, identity cards, Driver's License, polycarbonate passport datapages, others available on request
- Durability: 10+ years
- Resolution: up to 1.200 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

PROTECTIVE LAYERS

PARTIAL PROTECTIVE LAYER

- shape of protective layer is individually customizable
- protective layer just covers the holder's image
- additional holograms (transparent or metallized) can be included

FULL-FACE PROTECTIVE LAYER

- protective layer covers the entire card surface
- additional holograms (transparent or metallized) can be included

CLEAR PROTECTIVE LAYER

- protective layer covers the entire card surface

HOLOGRAMS IN PROTECTIVE LAYERS*

TRANSPARENT HOLOGRAM

- applicable on partial and full-face protective layer

FULLY METALLIZED HOLOGRAM

- metallic foil inside the hologram
- applicable on partial and full-face protective layer

PARTIALLY METALLIZED HOLOGRAM

- metallic foil inside the hologram
- applicable on partial and full-face protective layer

*Only available for partial and full-face protective layers

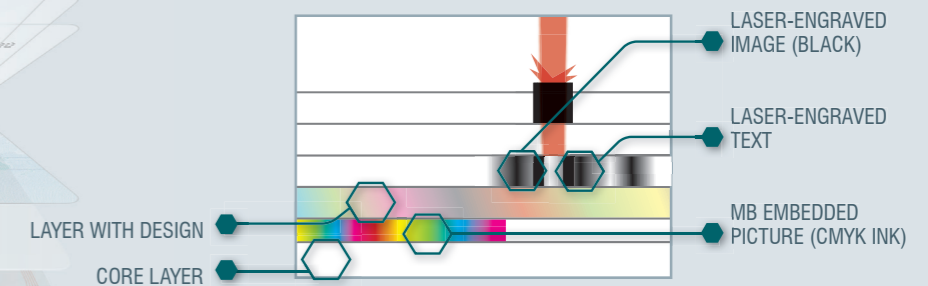Partial protective layer

Metallized hologram

MB EMBEDDED PICTURE
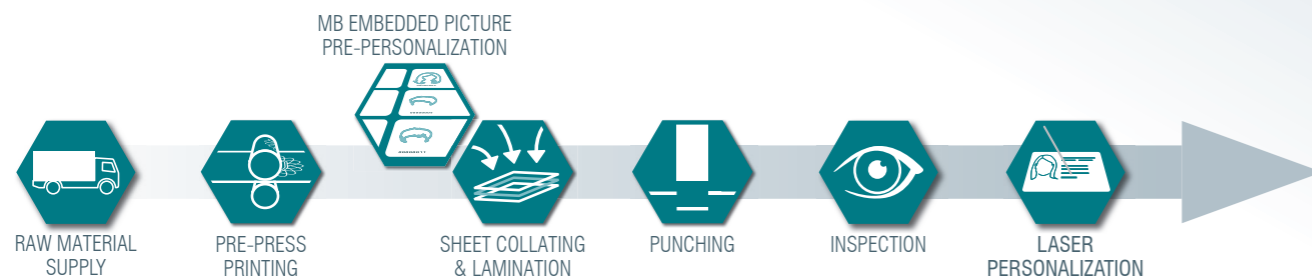## COLOR PICTURE INTEGRATED IN CARD BODY

Common color picture technologies have their limitations in durability, especially with regard to light fastness. For this very reason, Mühlbauer has developed the unique MB EMBEDDED PICTURE technology: The ordinary, already well-proven ID document production workflow has been extended by an additional pre-personalization process step before the different polycarbonate layers are collated and laminated together. The special inkjet personalization technology guarantees perfect picture quality (up to 1.440 dpi) and long-lasting durability – also with regard to light fastness. Furthermore, 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 holder's image is irreversibly incorporated in the multi-layered document body. Thus, the ID document is reliably protected from substitution and manipulation. Furthermore, as each document is already pre-personalized with the document holder's photo on sheet-base, there are no more blank documents in circulation which could potentially be used for fraudulent activities.

Mühlbauer's production management softwares MB INCAPE and MB MES enable the precise tracking of every single pre-personalized document. As this tracking noticeably simplifies for example the reject handling, a much higher yield can be achieved.

LASER-ENGRAVED IMAGE (BLACK)

LASER-ENGRAVED TEXT

MB EMBEDDED PICTURE (CMYK INK)

LAYER WITH DESIGN

CORE LAYER

MB ALFRESCO®

MB ALFRESCO® PLC

MB ALFRESCO® PPL

MB EMBEDDED PICTURE

MB EMBEDDED PICTURE PRODUCTION FLOW:
CONTROLLED BY THE PRODUCTION MANAGEMENT SOFTWARES MB INCAPE & MB MES

MB EMBEDDED PICTURE PRE-PERSONALIZATION

RAW MATERIAL SUPPLY → PRE-PRESS PRINTING → SHEET COLLATING & LAMINATION → PUNCHING → INSPECTION → LASER PERSONALIZATION

COLOR PICTURE INTEGRATED INTO THE CARD BODY

NO MORE BLANK DOCUMENTS IN CIRCULATION

HIGH-RESOLUTION COLOR PICTURE (1.440 DPI)

ON-DEMAND PRODUCTION

10+ LIFETIME OF MORE THAN 10 YEARS

FACTS & FIGURES

- Applications: high-secure cards, identity cards, Driver's License, polycarbonate passport datapages
- Durability: 10+ years
- Resolution: up to 1.440 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

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