

Image-to-Print

Printing Technology & Innovation Days

**Technical Innovations
in Rotogravure**

Thomas Zocher

Janoschka | 27th of November 2013

Warsaw, Poland

Janoschka | Innovation, Research and Development

Content:

1. Lightweight cylinder solutions and sleeve systems for gravure
2. RFID – Cylinder tracking
3. Continual development of electromechanical engraving and Laser Imaging

Janoschka | Innovation, Research and Development

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- 1. Lightweight cylinder solutions and sleeve systems for gravure**
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Cylight ®



Cylinder size:

face-width: 900 mm

Circumference: 600 mm

Weight: 28,2 Kg

➔ ~50% less weight...

➔ Already more than 60.000 pieces in the Market

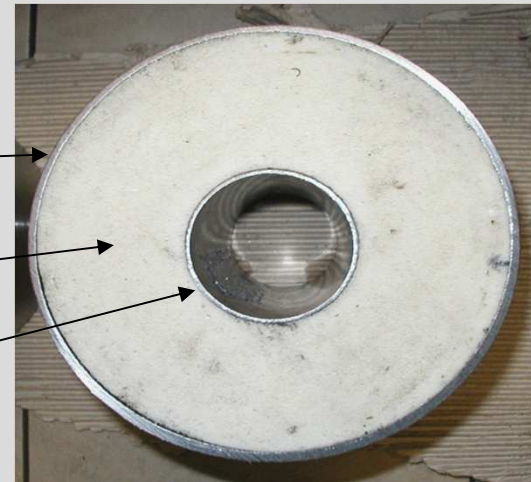
Cylight®

Technology concept

Thin outside steel pipe

PU-Sandwich layer

Thin inside steel pipe



R&D other materials | Aluminum

- Test-production is launched
 - New cylinder concept using Aluminum
 - Aluminum is 2,5 times lighter than steel
 - Target weight: 15 Kg (fw: 1.000 mm circ.: 500 mm)
- Requires new technology and investments in galvanic process



Aluminum-base



Copper-plated aluminum cylinder

Sleeve technology

- Light weight cylinder solutions



Sleeve technology

- Weight reduction of more than 90%
- Easy handling and shipping
- Easy storage



Sleeve technology

- Easy, fast, cost effective
- but un-flexible if you need different diameters!
- currently 1000 – 1500 Sleeves in the market



proROTO system

Innovative Rotogravure Sleeve System

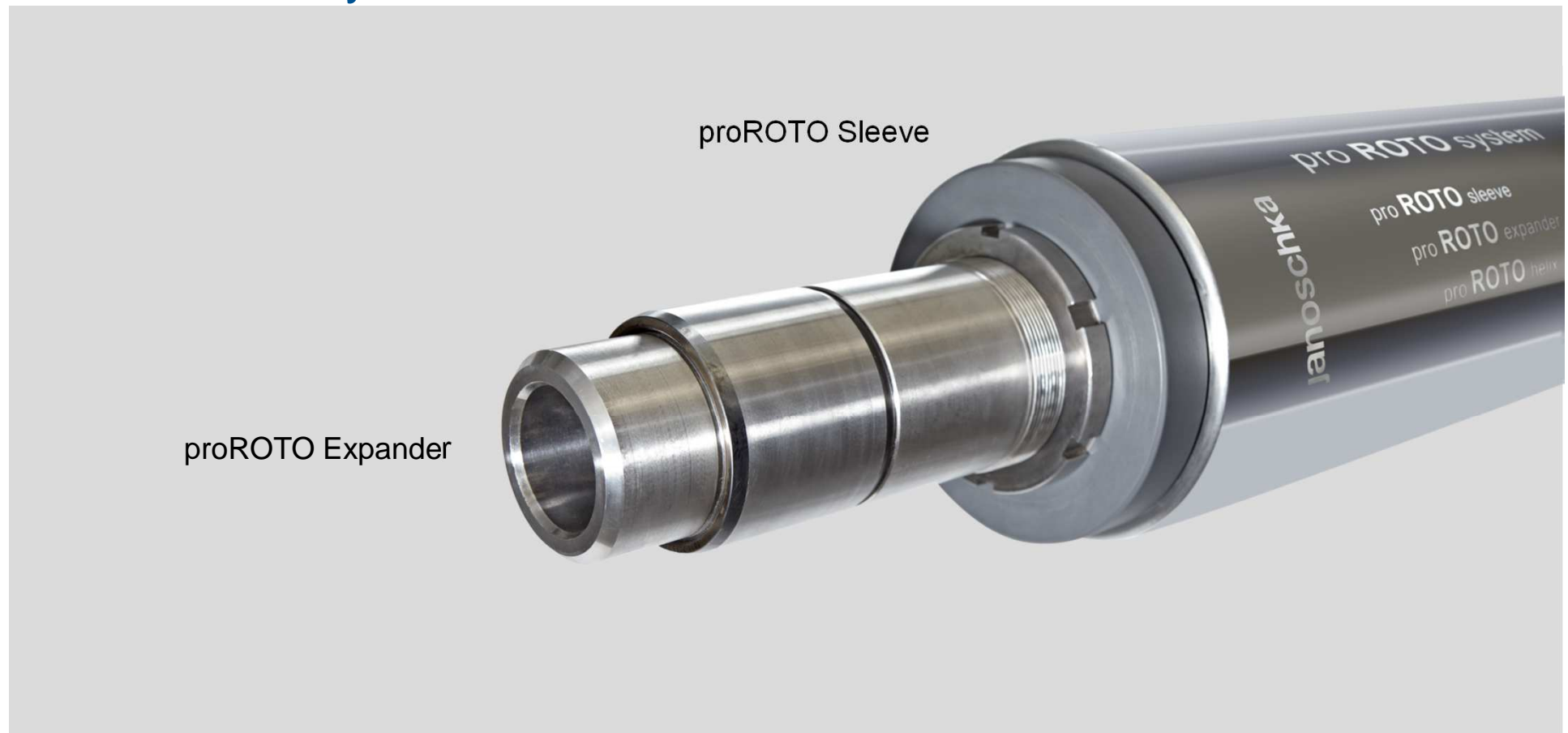
proROTO Expander

proROTO Helix

proROTO Sleeve



Basics of the system

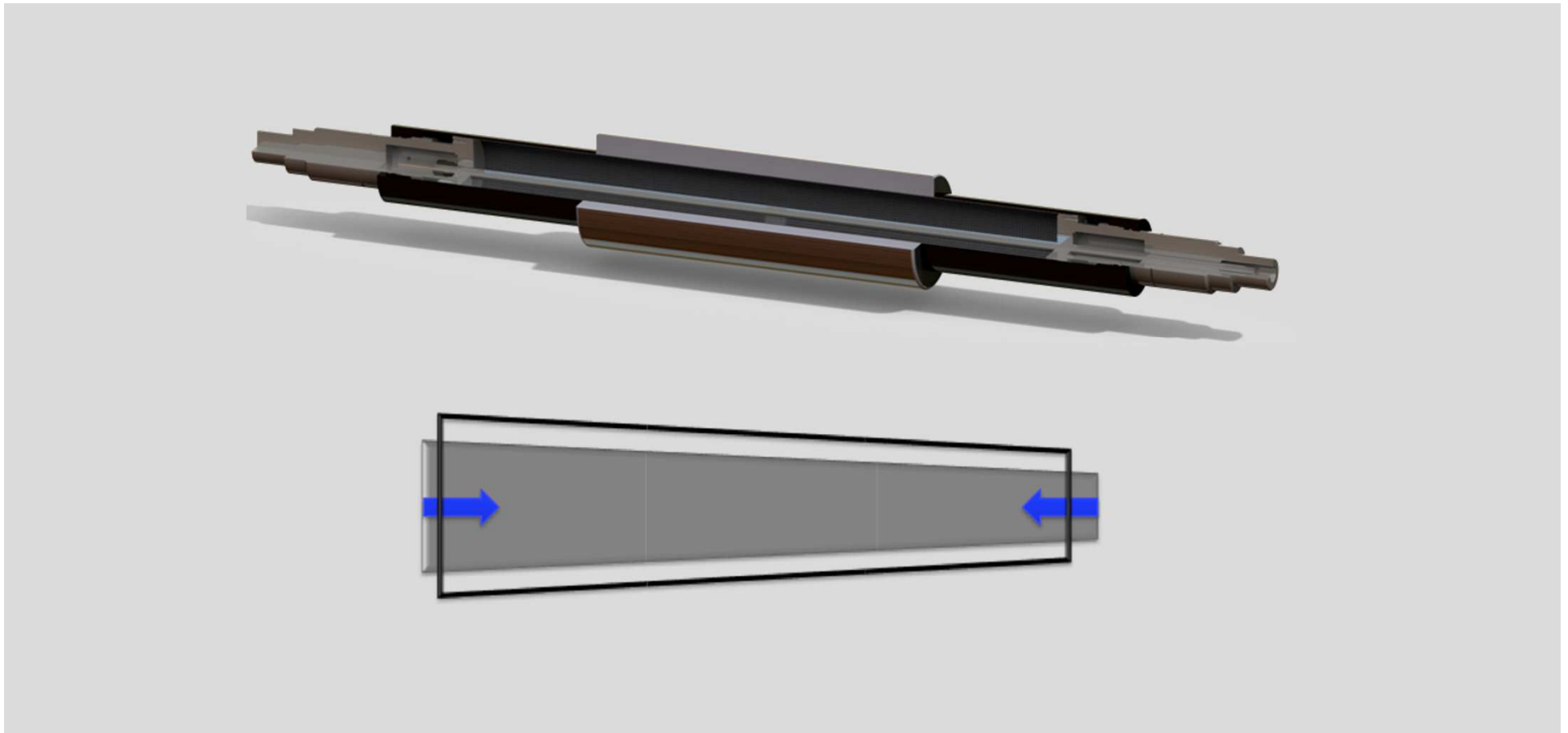


proROTO I Clamping-Mandrel

- Clamping-Mandrel made of high-precision CFK- material
- Quick & easy change of printing-tool in the printing press or external of the printing press
→ Reduced setup time and costs
- precise mechanical expansion of the mandrel and fixing of the sleeve
→ precisely positioned, aligned and fixed printing forms



Clamping-Mandrel | Principles

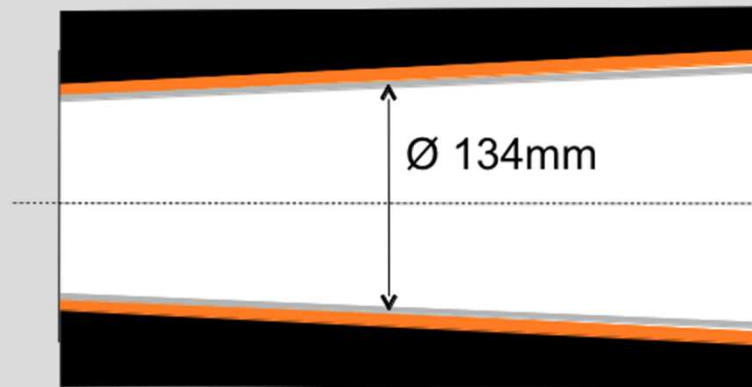
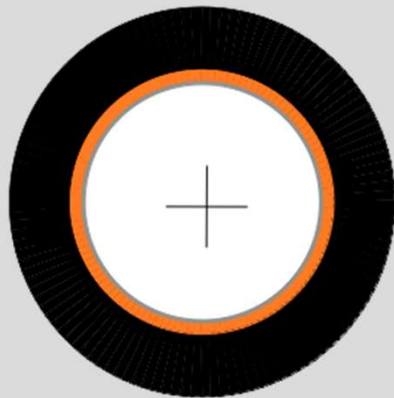


proROTO I Sleeve

- Sleeve made of reusable high-performance plastic
- Quick and Simple manual change-over at the printing-press
- High-precision and resistant core of nickel for a precise and durable use on the expander
- Light-weight solution to reduce handling, transport and storage costs
- Printing-Sleeves can be stored in high-rack warehouses
→ Saving of storage costs and space



proROTO I Sleeve

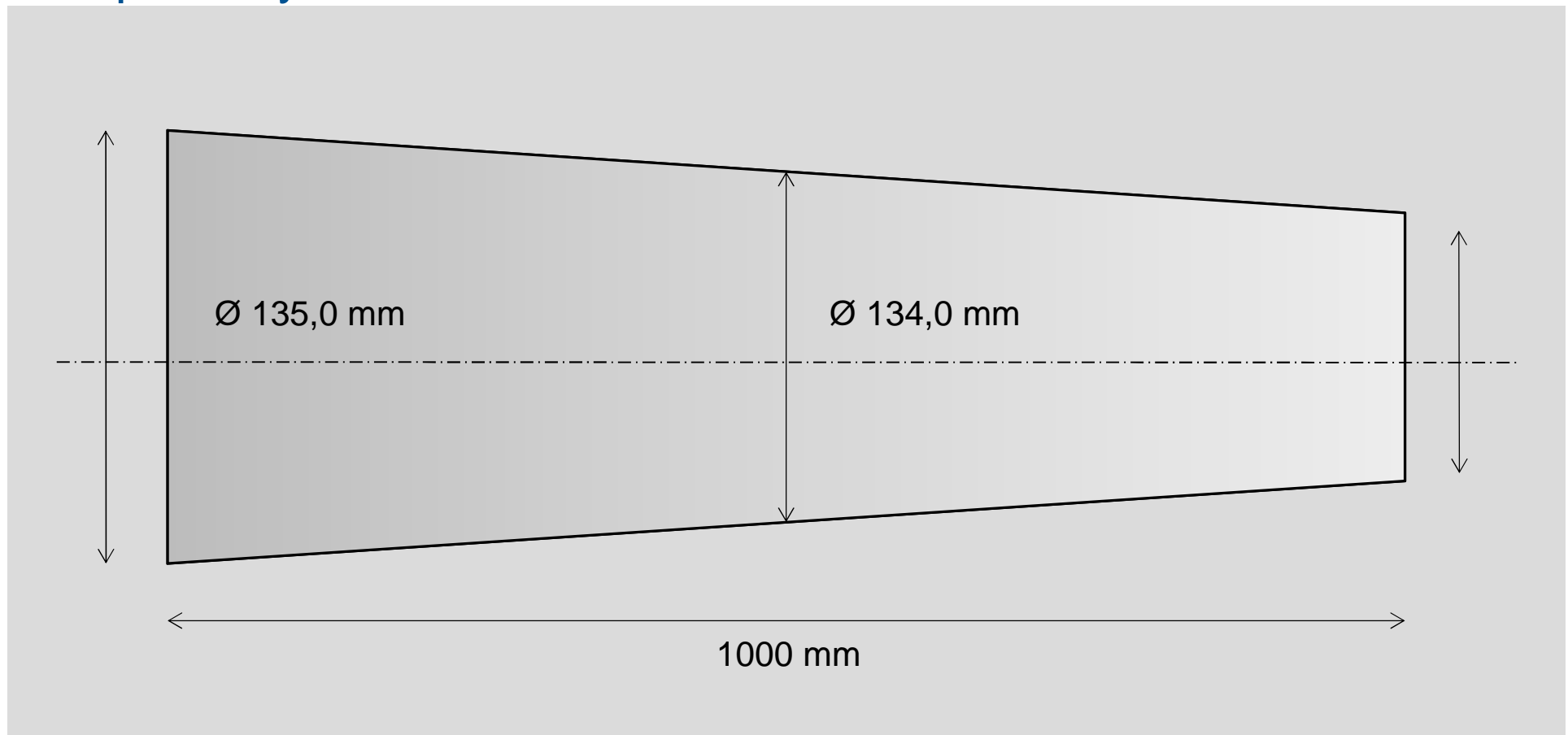


PP layer 5...30 mm

Cu layer 500 μm

Ni layer 200 μm

Compatibility



proROTO I Helix

- Bridges the difference between the “set”-circumference of the expander and the “variable” circumference of proROTO sleeves, needed in packaging-printing.
- proROTO helix is not linked to printing design and therefore independently and permanently available.
- The use of thin and light-weight proROTO sleeves, saves raw-material protects the environment and reduces cost.



Easy Assembling

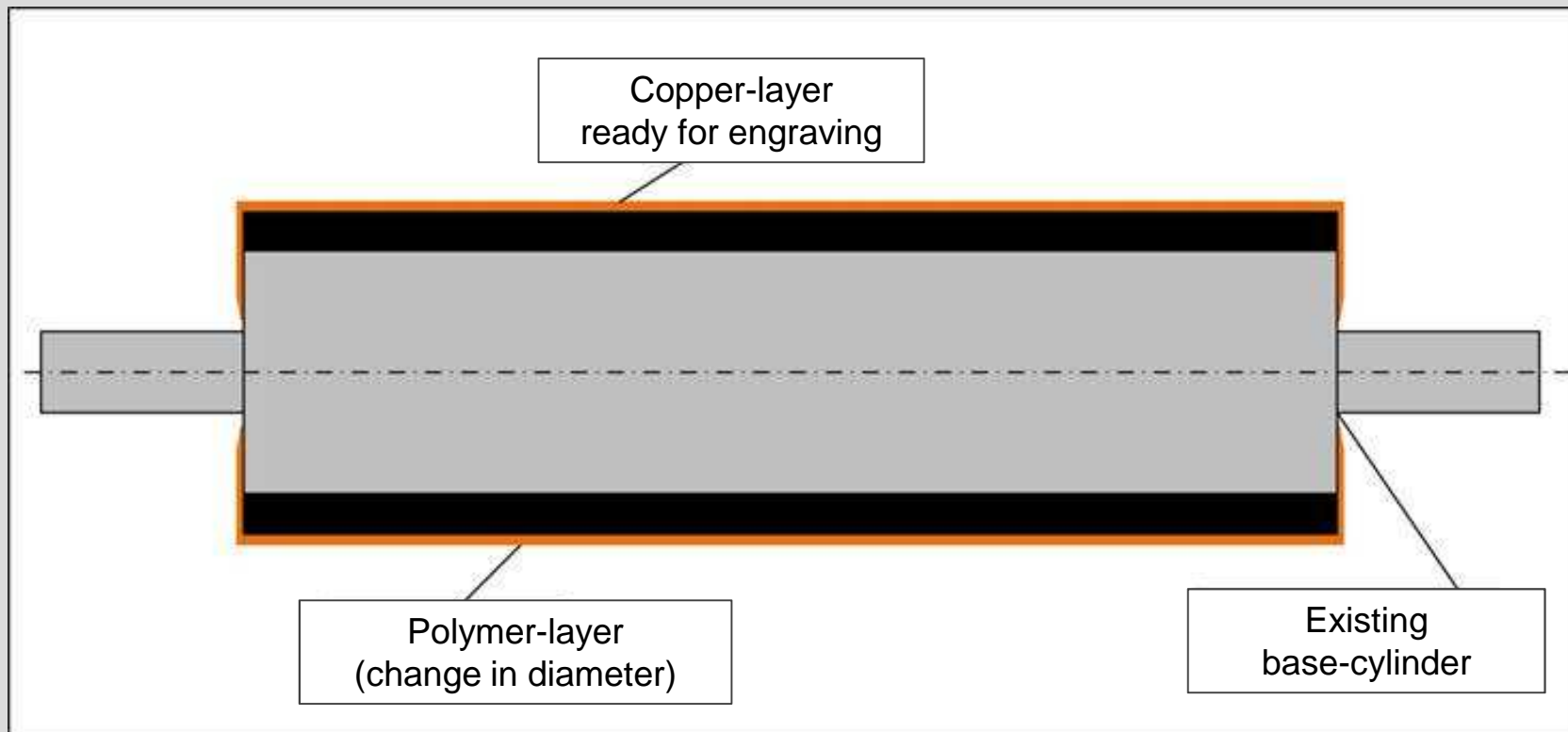


Benefits of ProROTO system against traditional steel-base

- Price advantage:
 - Lower cost of each print-job
 - Reduced capital-investment
- Availability:
 - Standard sizes in stock
 - Quick and easy adaptation to requested circumference
- Logistics:
 - Less weight / low transportation costs
 - Possible air-freight cargo / overseas deliveries
- Handling:
 - Optimum utilization of storage-space
 - Sleeve change within the printing unit possible
 - Health & Safety concerns of staff on shop-floor
 - Savings in crane logistics



ProROTO Classic | Diameter changes



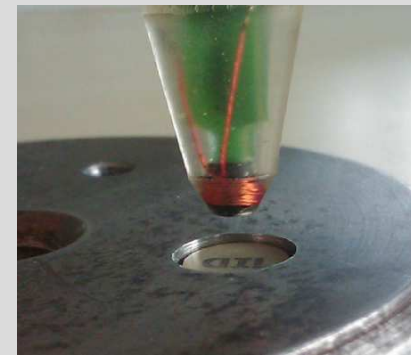
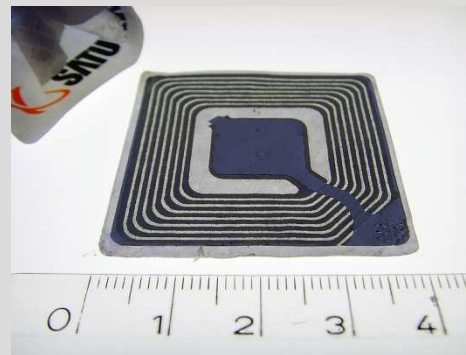
Janoschka | Innovation, Research and Development

Content:

1. Lightweight cylinder solutions and sleeve systems for gravure
2. **RFID – Cylinder tracking**
3. Continual development of electromechanical engraving and Laser Imaging

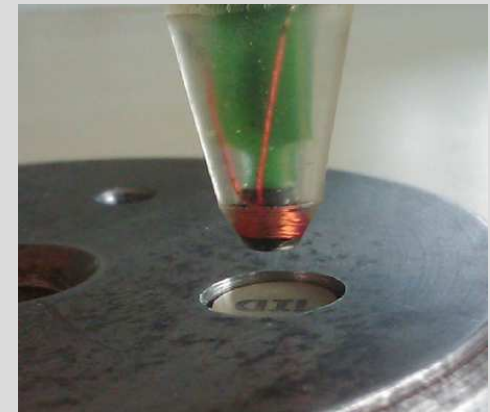
R&D - Innovations

- RFID - Cylinder tracking
- RFID = Radio Frequency Identification



R&D - Opportunities for rotogravure

- Workflow and storage optimization
- Product Life Cycle
- Printing Costs savings
- Automatization of printing pre-settings (reduction of waste and setup time)
- Improved Process consistency:
Print adjustments can be known before the job enters the press

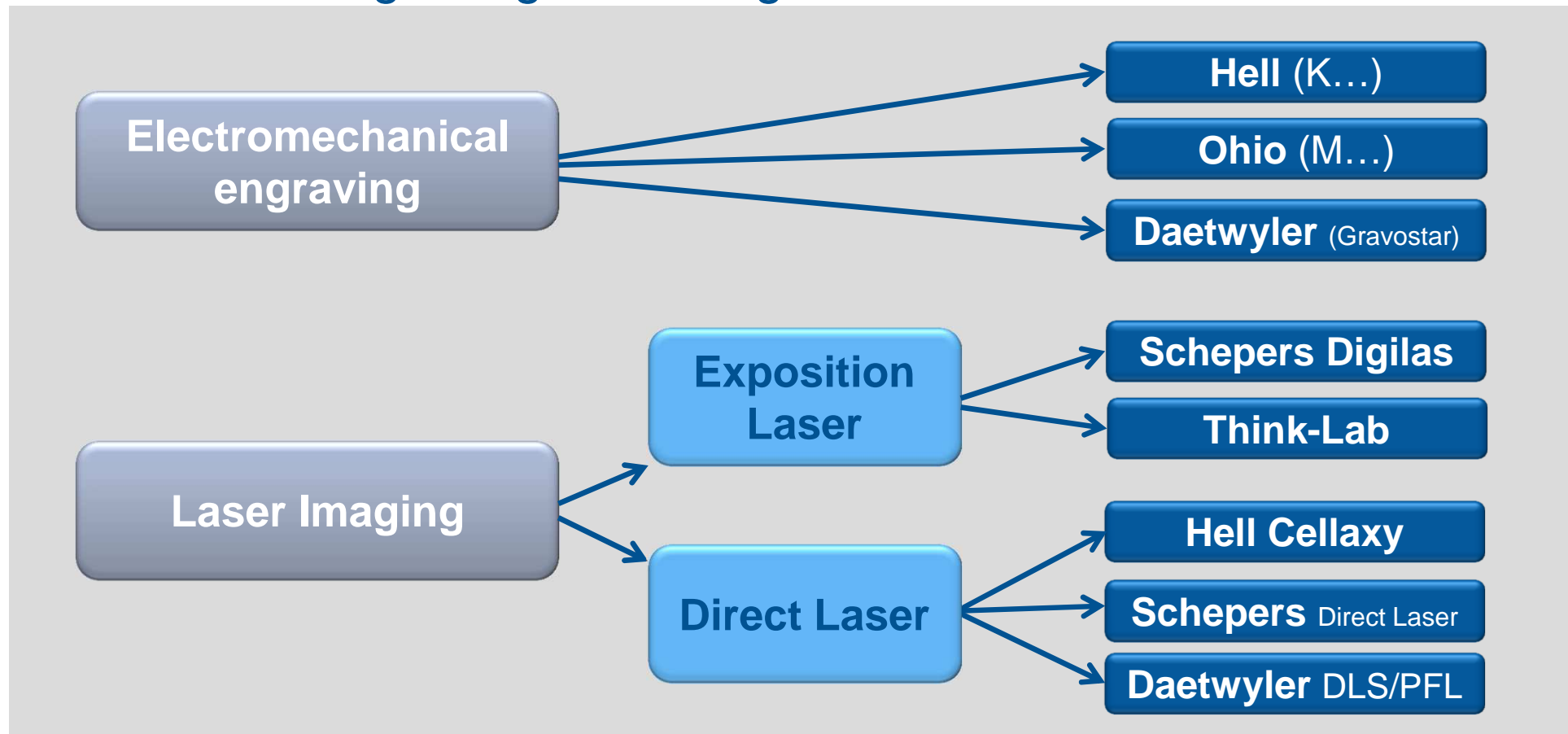


Janoschka | Innovation, Research and Development

Content:

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2. RFID – Cylinder tracking
3. **Continual development of electromechanical engraving and Laser Imaging**

The different engraving technologies



The Principles I Cell geometries

**Stylus
(electromechanical)**



Variable in size
and variable in depth

**Laser
Exposure**



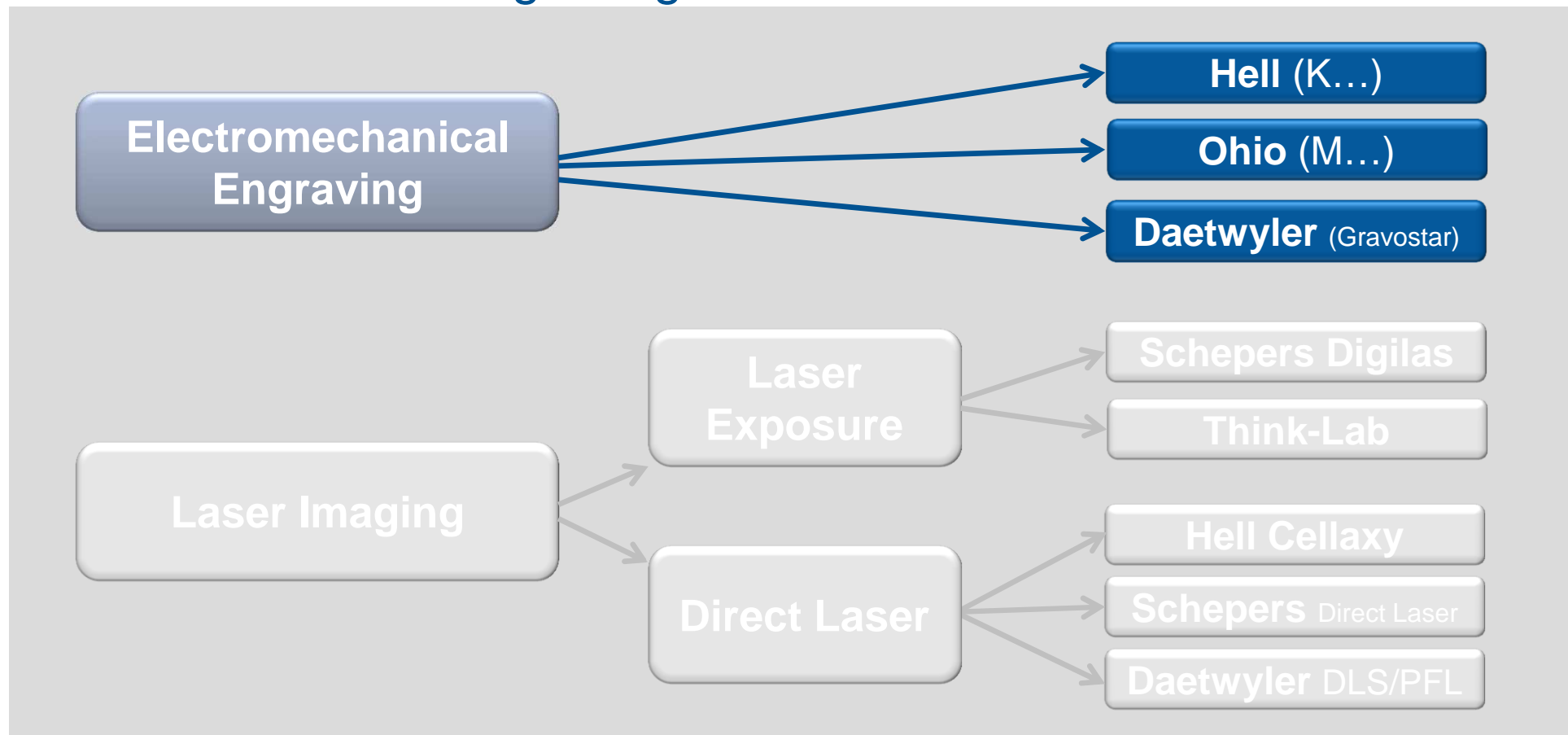
Variable in size
not in depth

**Direct
Laser**



Variable in shape,
in size and in depth

Electromechanical Engraving



3 machine types available in the market



Hell K500 series



Gravostar



Developments | Atomization

Today, engraving machine can be integrated in automatic production lines .
Several of Janoschka's production sites are equipped with automatic lines,
for example Nord Hélios in France.

Developments | Atomization : Nord Hélio in France



Developments | Atomization : Nord Hélios in France



Developments | Atomization : Nord Hélios in France



Developments | Atomization : Janoschka Kippenheim in Germany



Developments | Performance

Electromechanical cylinder engraving



Development of faster engraving heads:

→ 3500 Hz → 8000 H → 12000 Hz*

*Beta test

Development of new engraving heads



HelioSprint BC



HelioXtreme 32



HelioSprint III

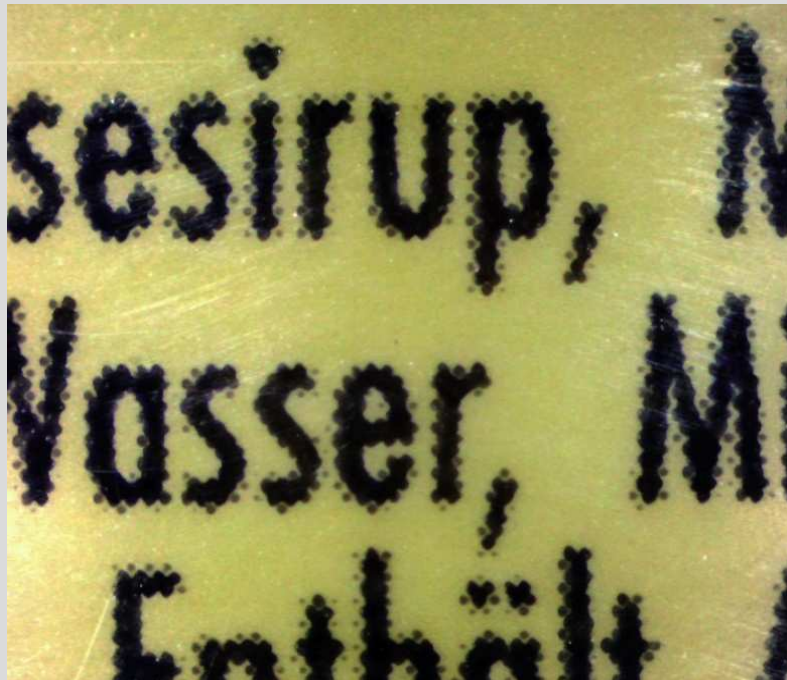
Developments | Cell geometry

Electromechanical cylinder engraving

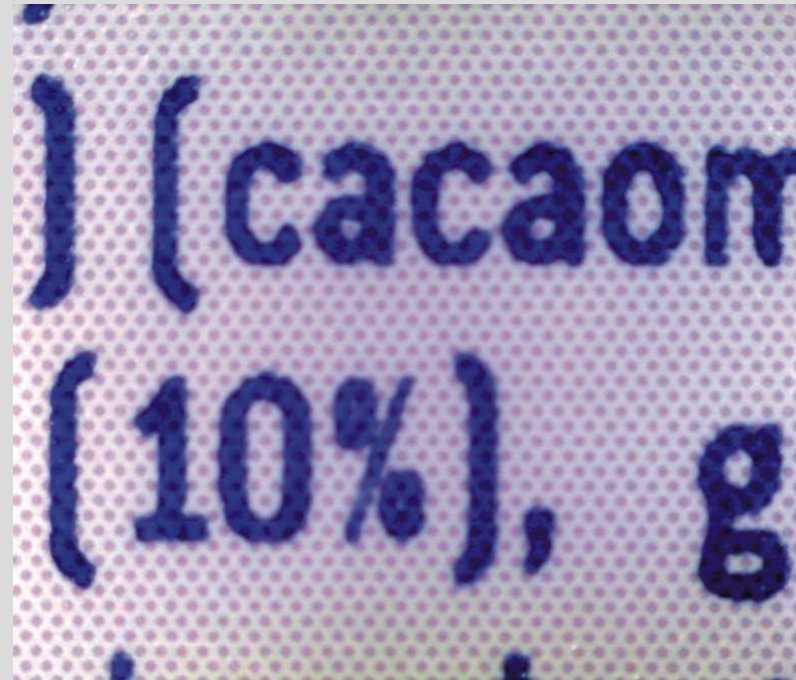


*Xtreme*Engraving

Xtreme Engraving

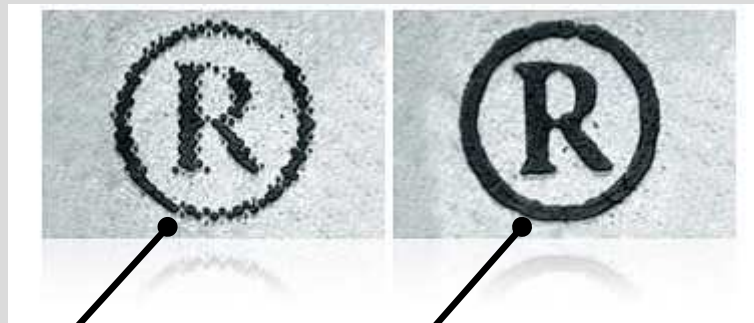


Normal Engraving



Xtreme Engraving

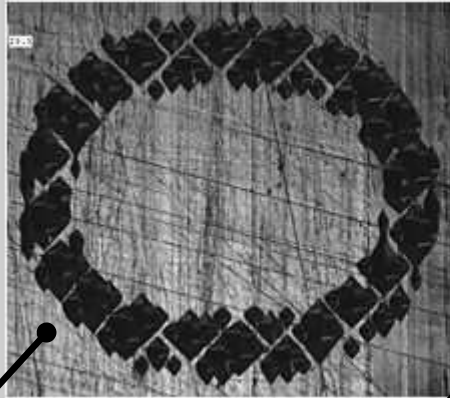
Xtreme Engraving



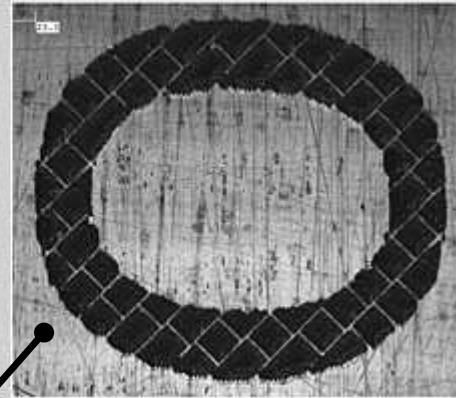
Conventionally
engraved

Xtreme
engraved

Xtreme Engraving



Conventional
engraving



Xtreme
Engraving

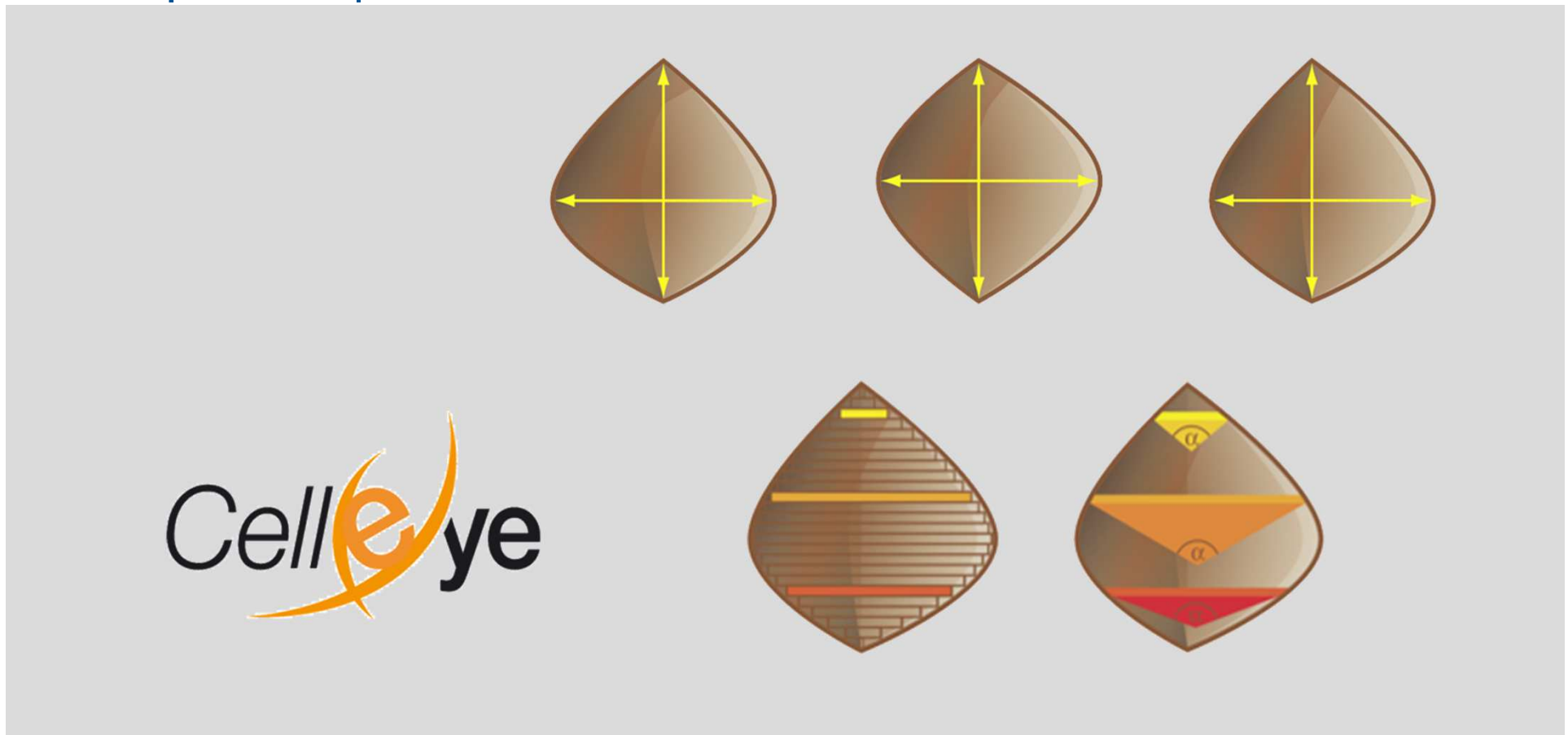
Developments | Volume control measurement

Electromechanical engraved cylinders



Cell-guard III

Developments | Volume control measurement

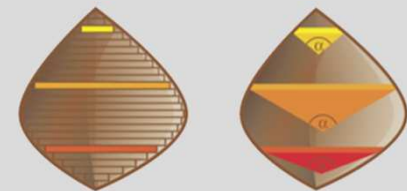


Volume control measurement

Very efficient for product families:

- Perfect process control
- No readjustment of colors
- Waste reduction

Cell^eye

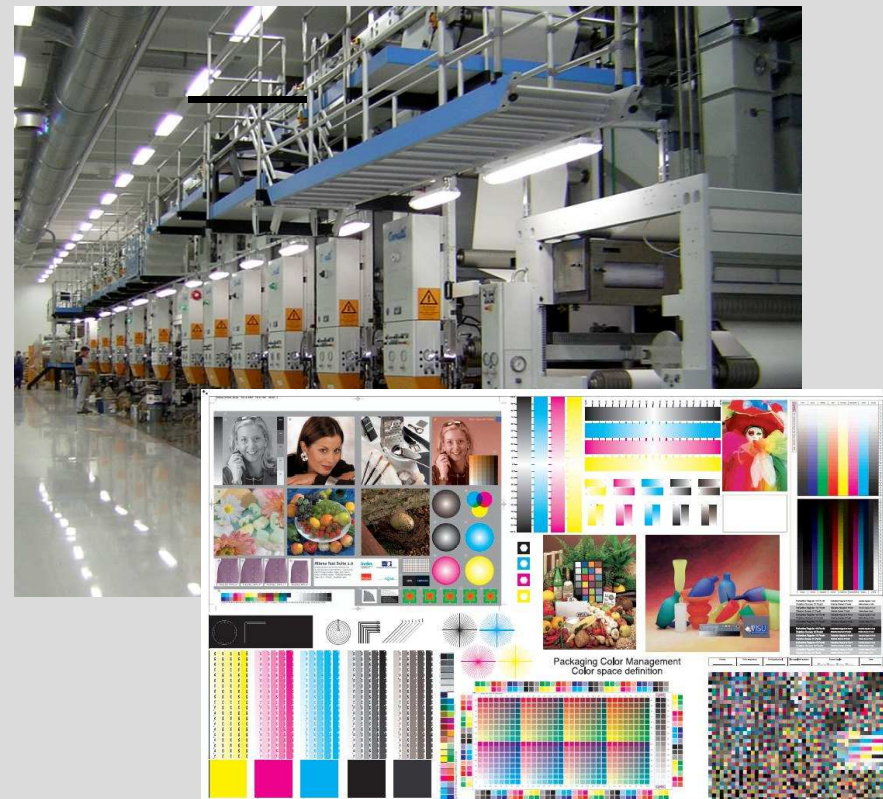


PCM I Print Color Management

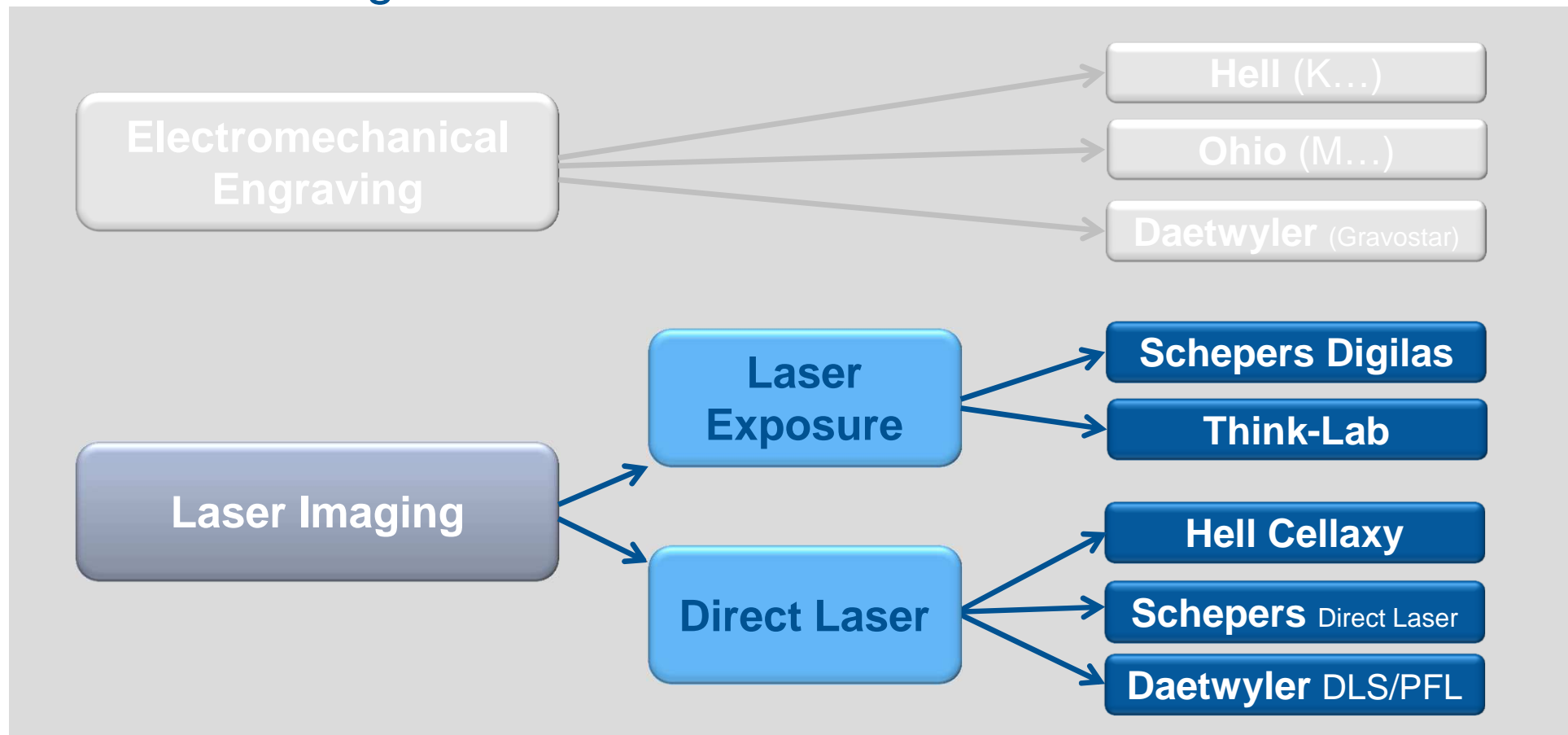
Cell(e)ye combined with Print Color Management and printer specific profiles taking in account:

- Machine settings
- Inks
- Substrates
- Cylinders

Will ensure excellent results and greatest efficiency to our customers.



Laser Technologies



Laser Imaging I Another dimension...

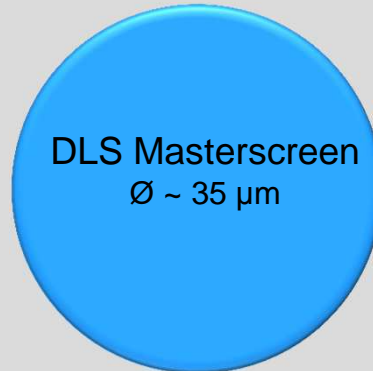
Exposition Laser
Think-Lab
 $\varnothing \sim 2 \mu\text{m}$



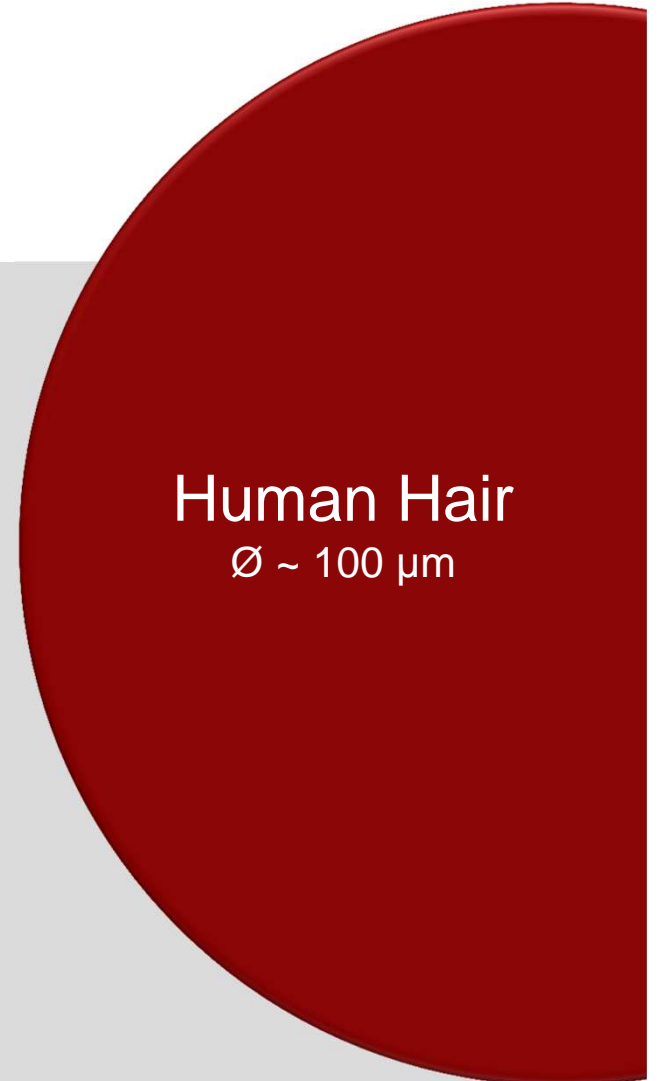
Laser direct
 $\varnothing \sim 10 \mu\text{m}$



DLS Masterscreen
 $\varnothing \sim 35 \mu\text{m}$



Human Hair
 $\varnothing \sim 100 \mu\text{m}$



Laser Technology : our Future

World Wide, **5 Laser technologies** are **available**:

- Daetwyler DLS (Swiss)
- Hell Cellaxy (German)
- Digilas direct (German)
- Digilas exposed (German)
- Think Lab (Japanese)

Janoschka is the only service house who has all 5 technologies and the related know-how.

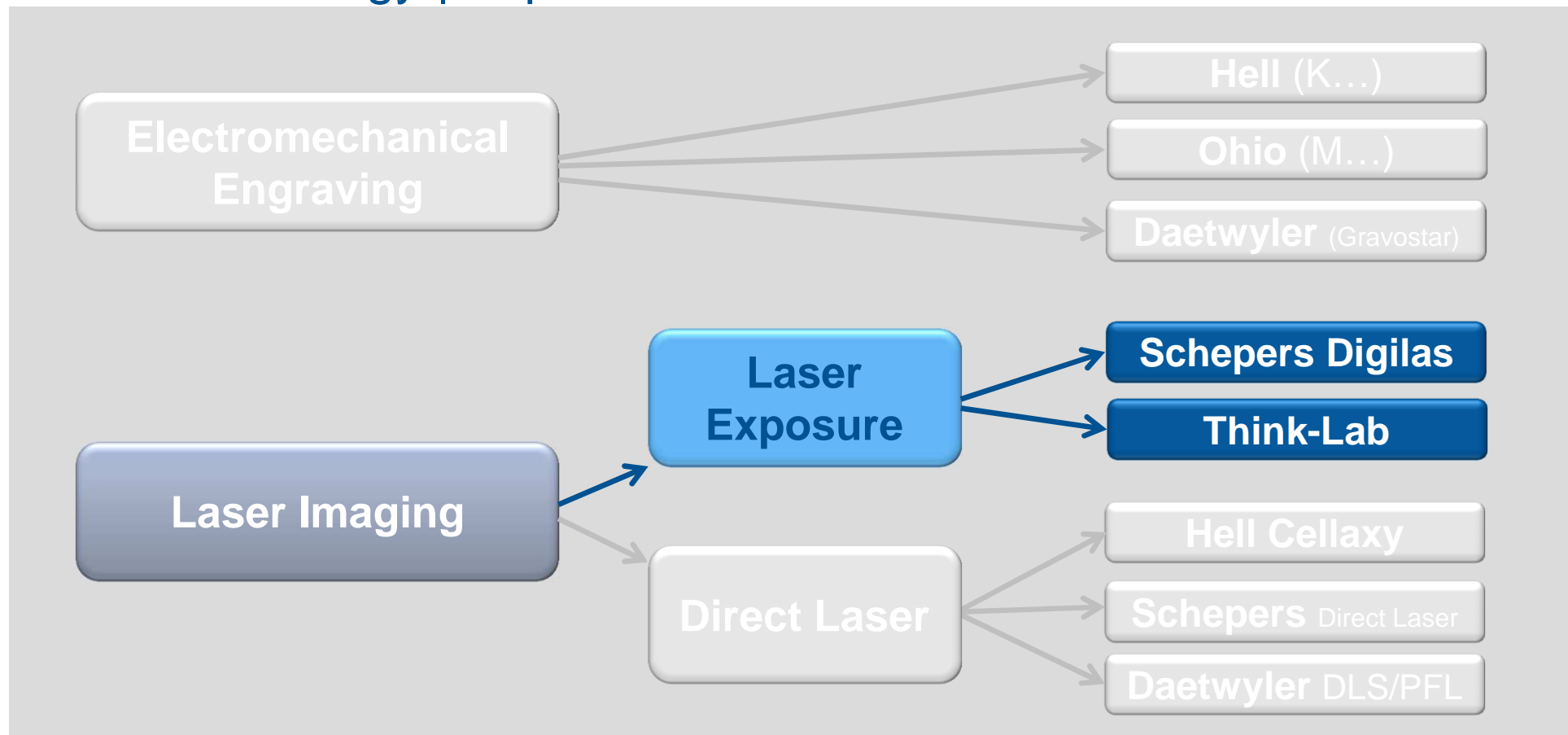


Markets for Laser Technology I Applications

- Tobacco Market
- Flexible Packaging
- Pharmaceutical Packaging
- Décor printing
- Publication
- Security printing
- Embossing
- Special Applications



Laser Technology | Exposition Laser

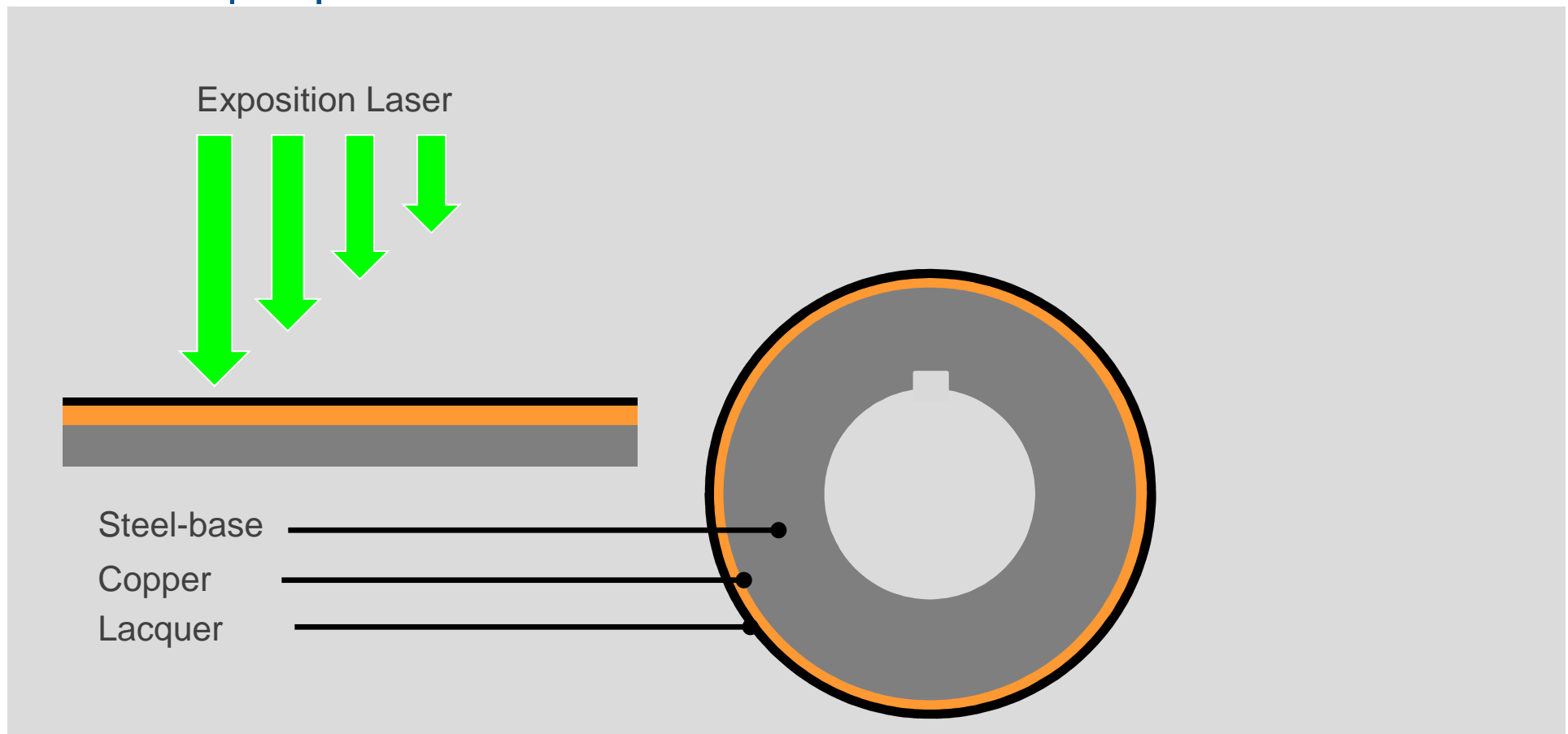


DIGILAS | Exposition Laser

- Fiber laser in a one beam- or multiple beam configuration or imaging specially coated gravure cylinders.
- Dot size and resolution < 10 μm
- Provides special screens, razor-sharp lines at very high quality level

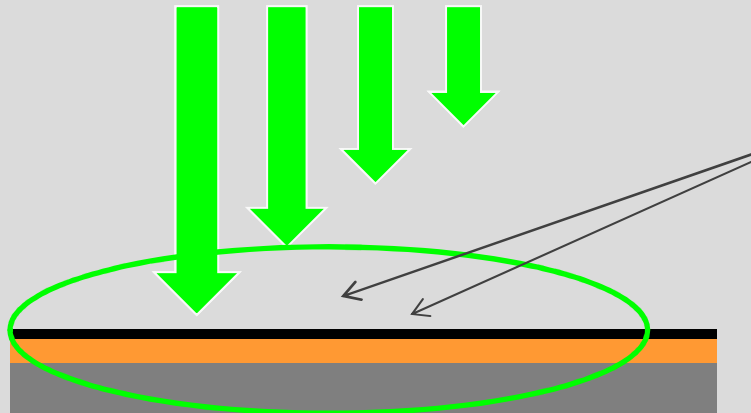


DIGILAS | Exposition Laser

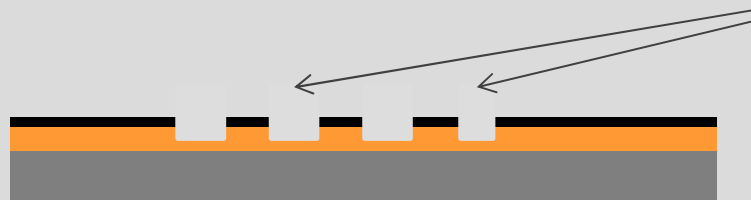


DIGILAS | Exposition Laser

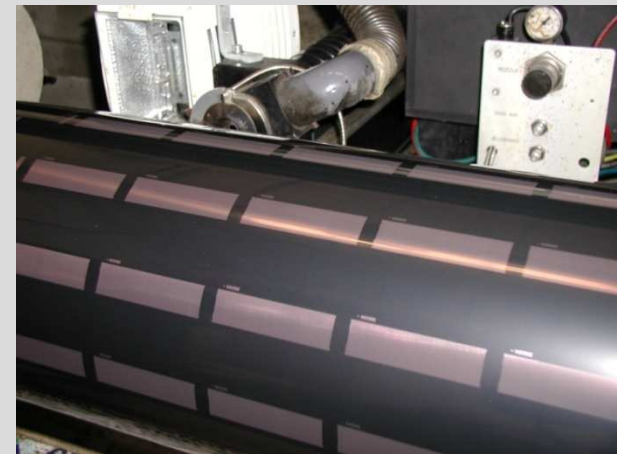
Laser Exposure



Laser "burns"
lacquer surface

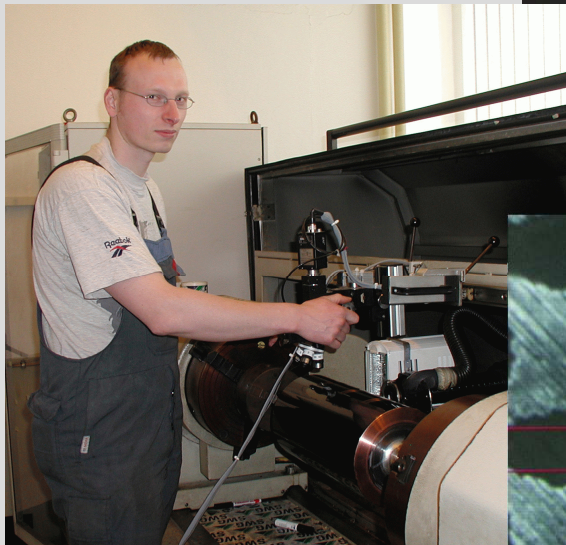


Cylinder (cell)
is then chemically etched
and the lacquer removed...

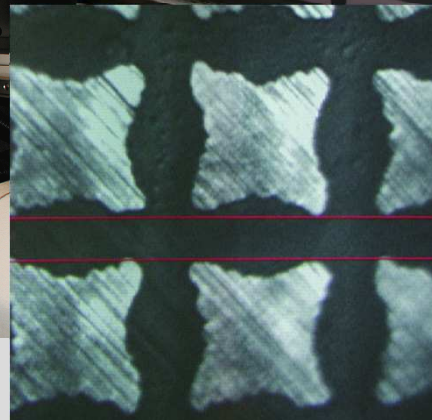


DIGILAS | Exposition Laser

Cylinder
check



Laser
Cylinder



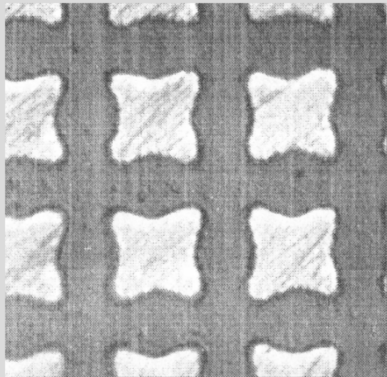
„pillow-shaped“
cell

DIGILAS | Exposition Laser

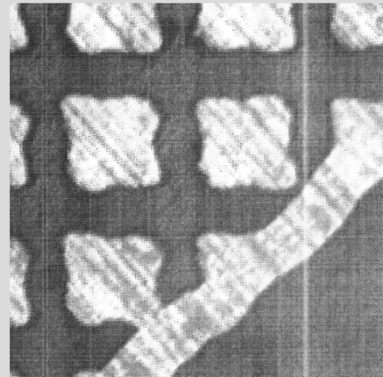


DIGILAS | special screens

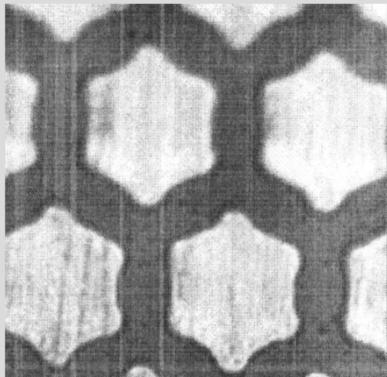
„Pillow“
shaped cells



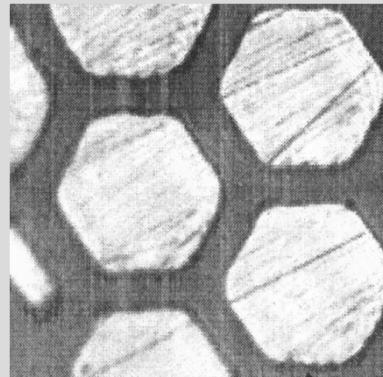
„Pillow“
shaped cells
with outline



Hexagonal
shaped cells

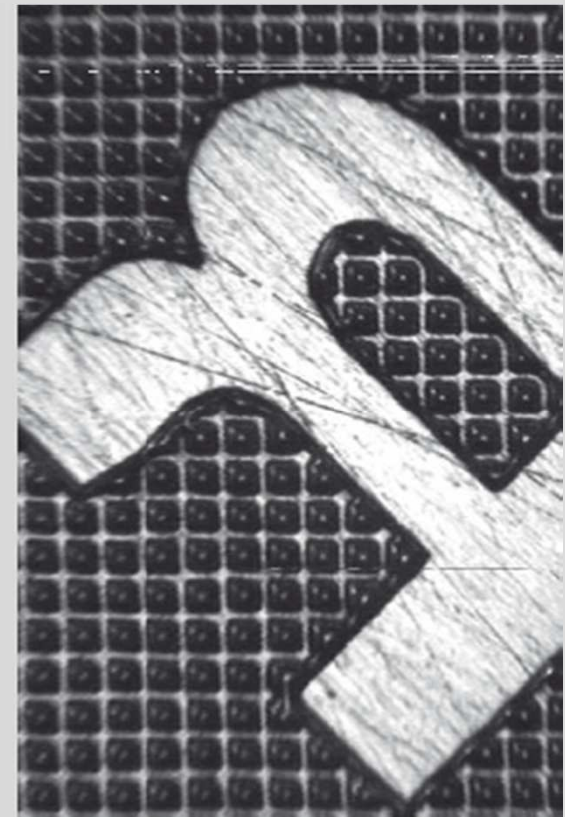


Hexagonal
shaped cells
(Honeycomb)



DIGILAS | Exposition Laser

Excellent for line-
work and fine type



Think-Lab

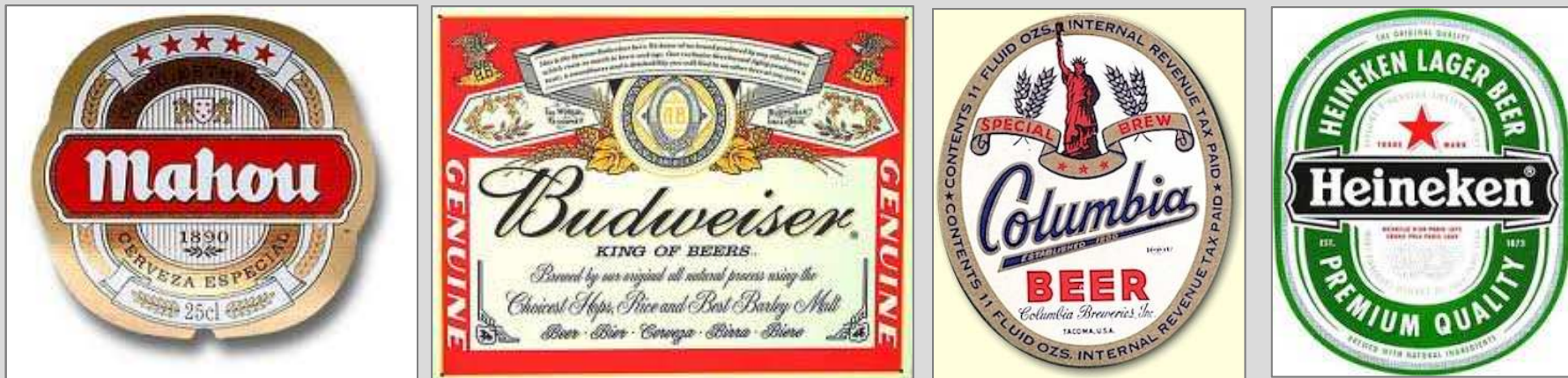
similar results can be achieved with the Think-Lab technology



Fields of Applications | Labels



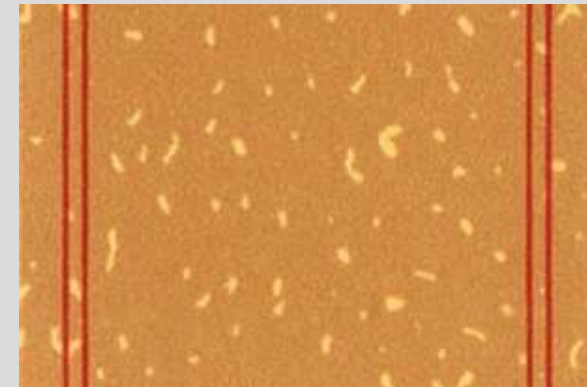
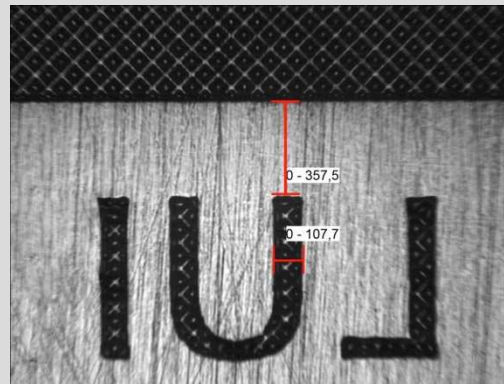
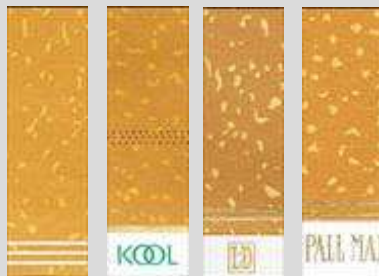
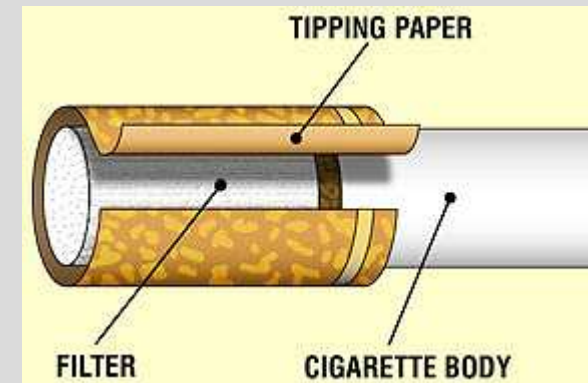
Fields of Applications | Labels



- Intense colors, fine lines, text and logos

Tipping I Cigarette Filters

- 1 or 2 colors “cork design” (line-work)
- Fine lines and logos
- Laser technology recommended !



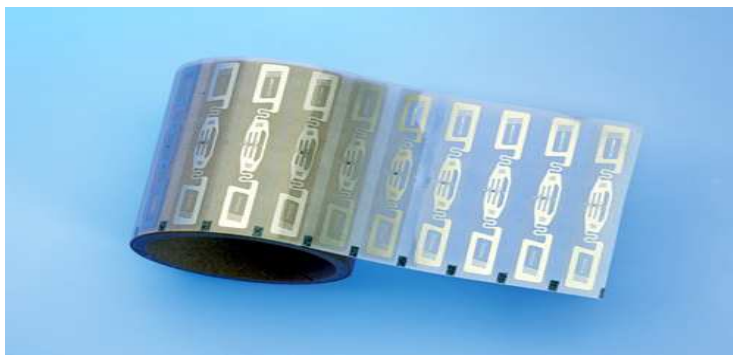
Tipping | Cigarette Filters | today

- multiple colors
- more and more half-tone
- more intense colors
- special inks
- .../



Fields of Applications I Pharmaceuticals

- Fine line-work, text & elements
- difficult substrates
- Brand protection
(integrated security features)

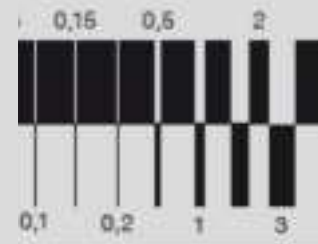


Fields of Applications | Pharmaceuticals



Fields of Applications I Security Features

- visible without additional appliances
- Hologram
- Finest design reproduction –
line size $\geq 0,1$ mm
- Colors with changing effects related
to the viewing angle
- Water mark
- Tactile effects

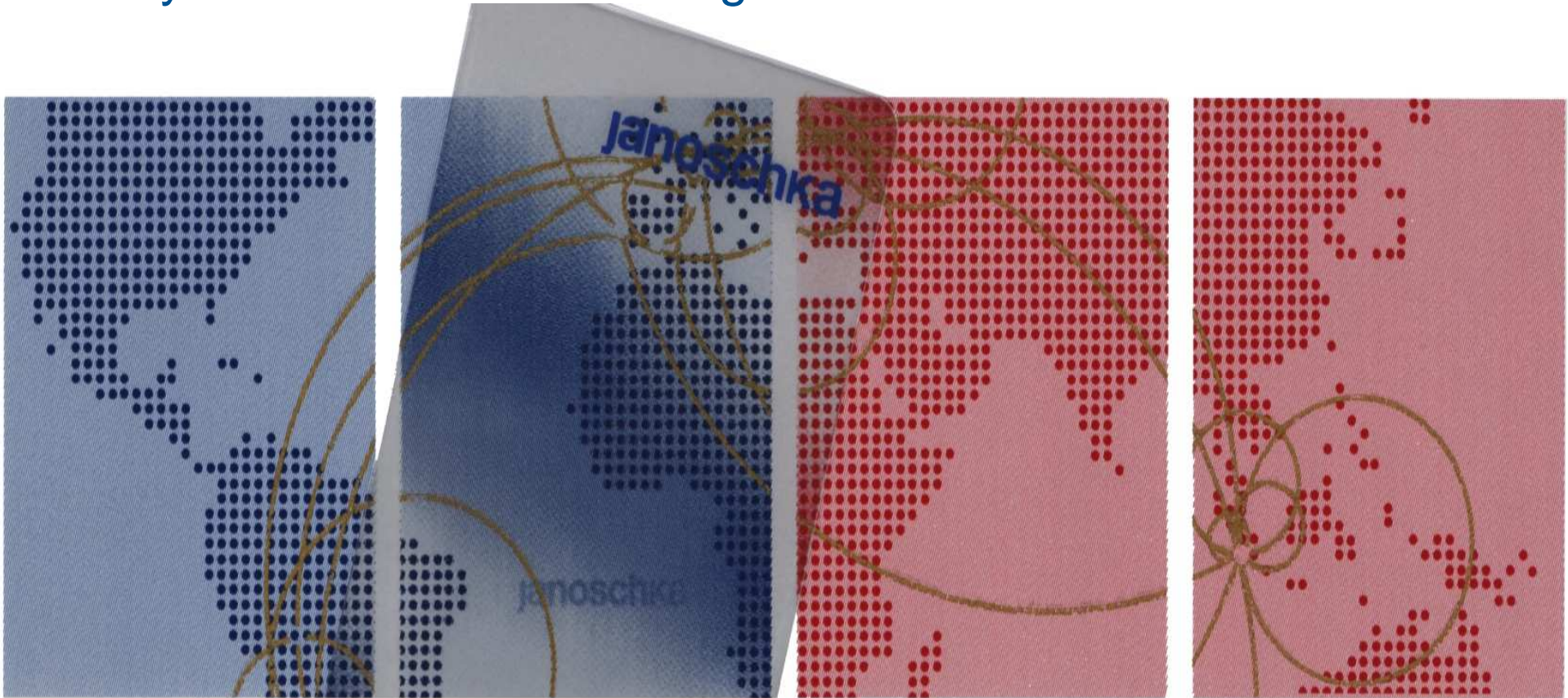


Line sizes in mm

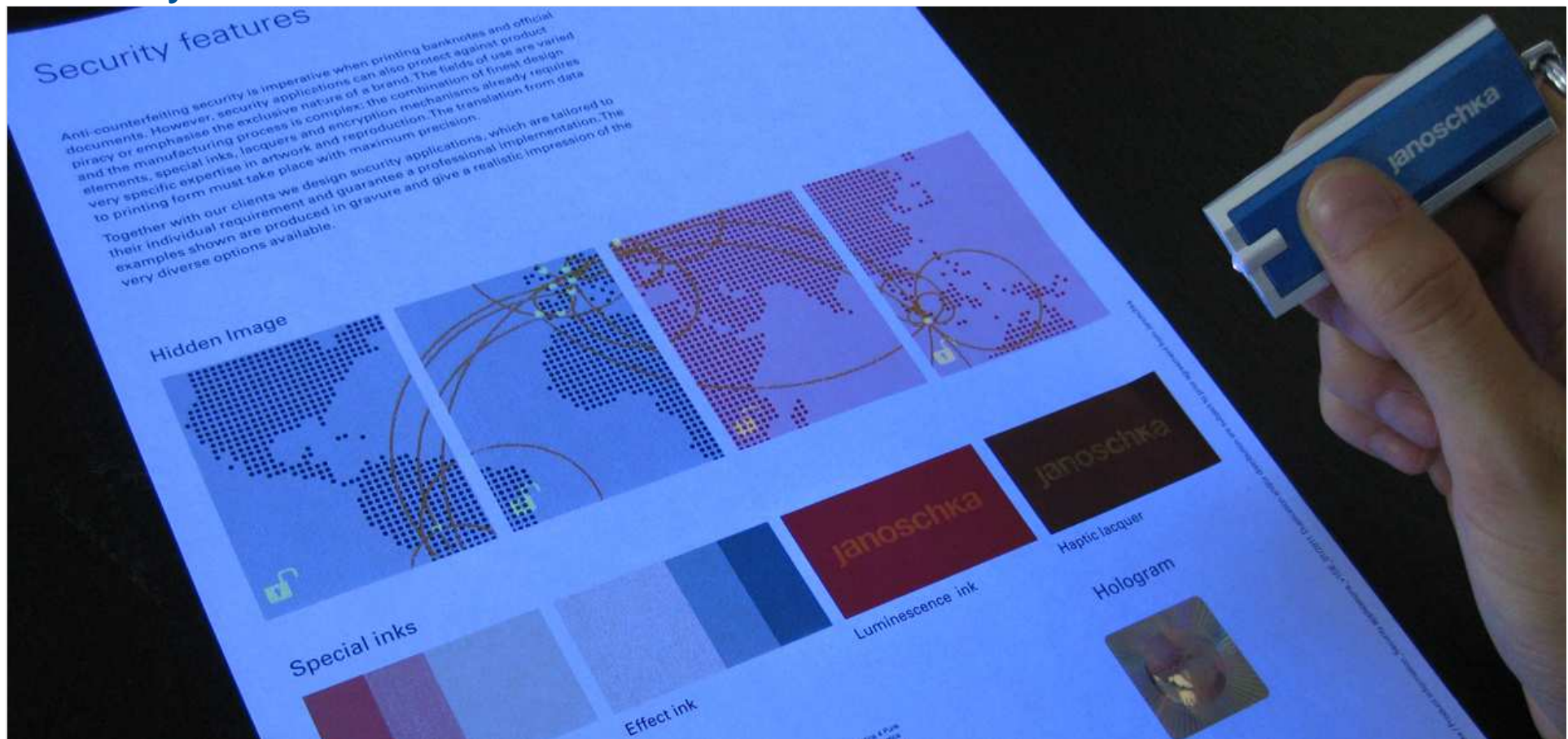


Holograms

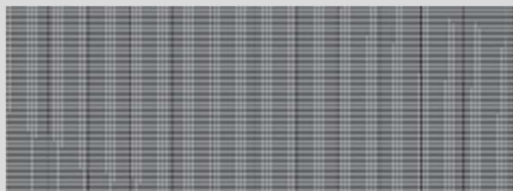
Security Features I Hidden Images



Security Features | Luminescence Colors



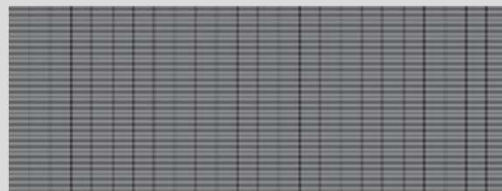
Security Features I Micro- and Nano text



Mikro text with 0,15 mm font size

Janoschka Janoschka
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Janoschka Janoschka
Janoschka Janoschka

Ratio x100



Nano text with 0,015 mm font size

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Ratio x100

Security Features I Screen less font reproduction

- Line sizes < 0,05 mm

- examples:
- Micro prints
- Nano prints



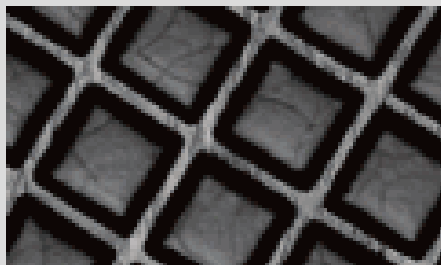
With screen



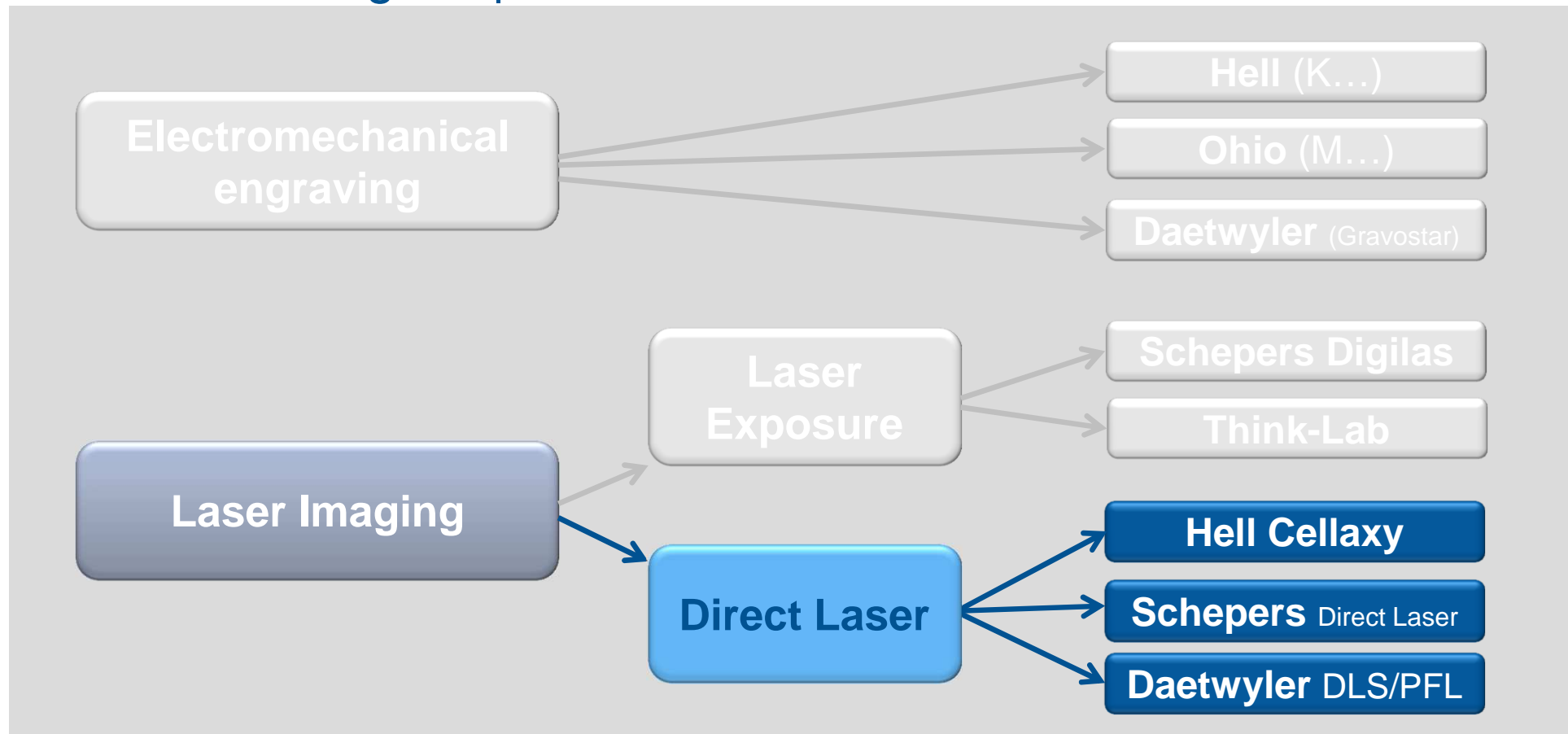
screenless

Fields of Applications I “Heavy Volume” I Special Applications

- Hotmelt / Wax
- Cold Seal
- Lacquer
- Primer
example: medical packaging

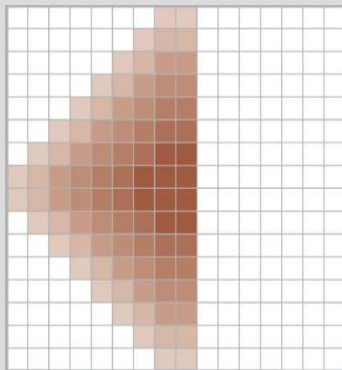


Laser Technologies | Direct Laser



Laser engraving | Hell Cellaxy

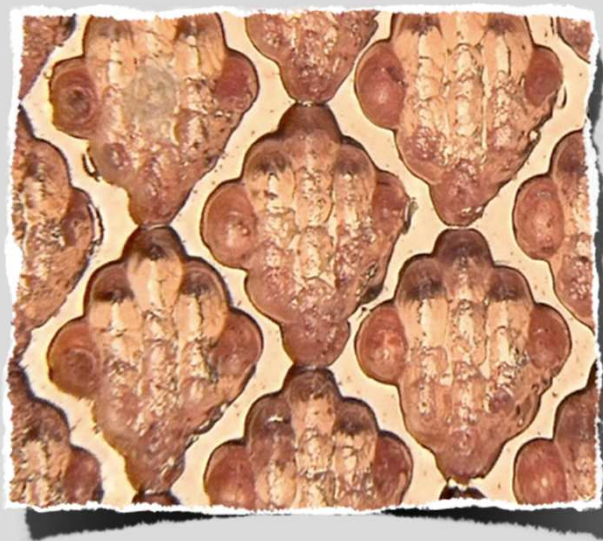
- Direct laser engraving
- Similar to Offset ImageSetter (Cells are created by multiple exposing lines)
- Engraving in copper



HELL *Cellaxy*

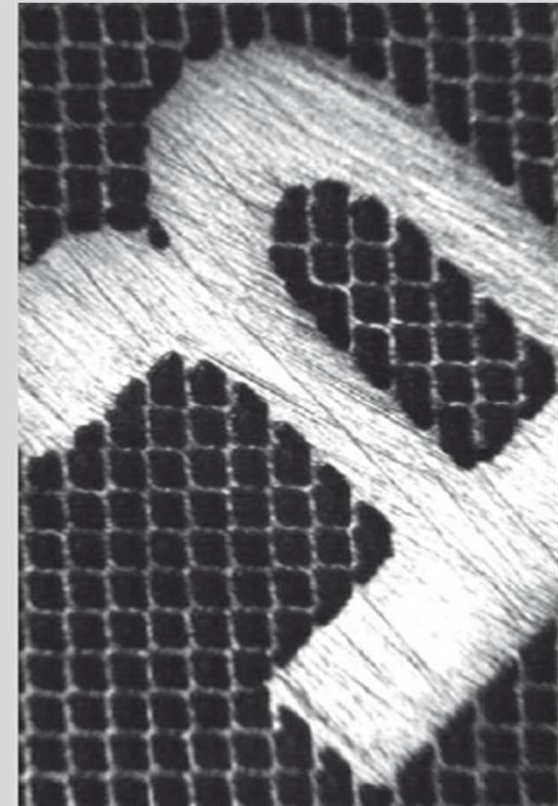
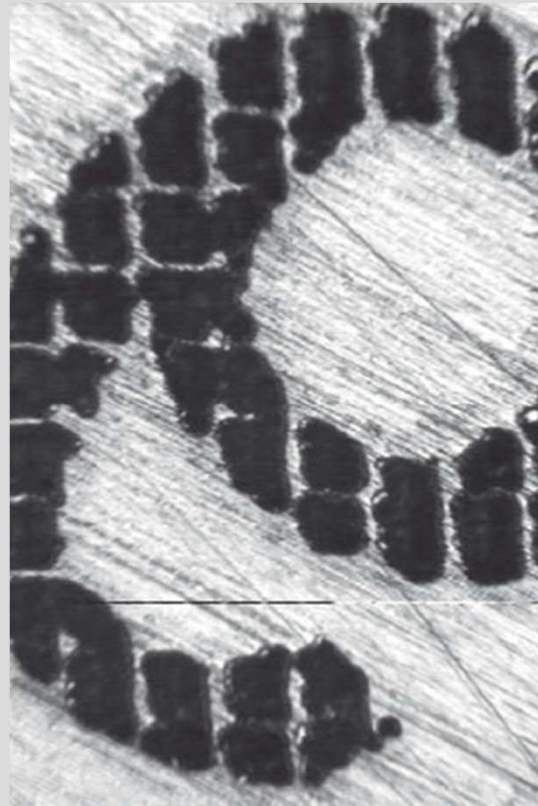


Hell Cellaxy | engraving in copper

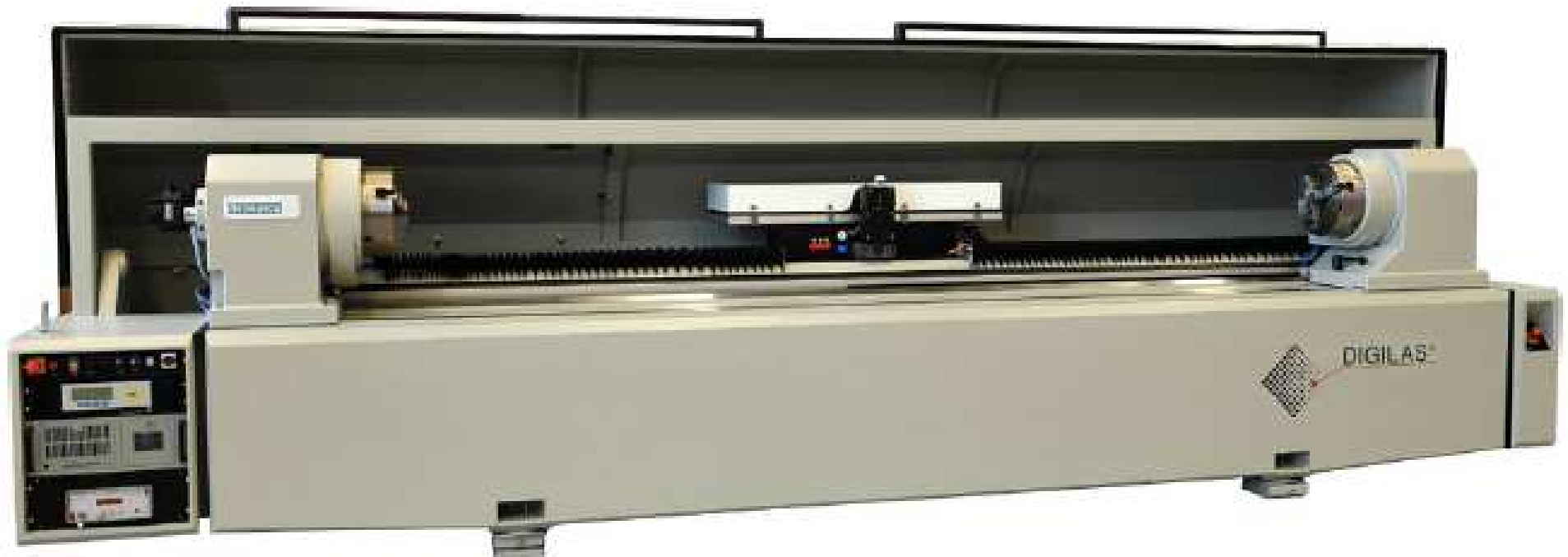


Laser engraving | Hell Cellaxy

Excellent for line-work and fine type



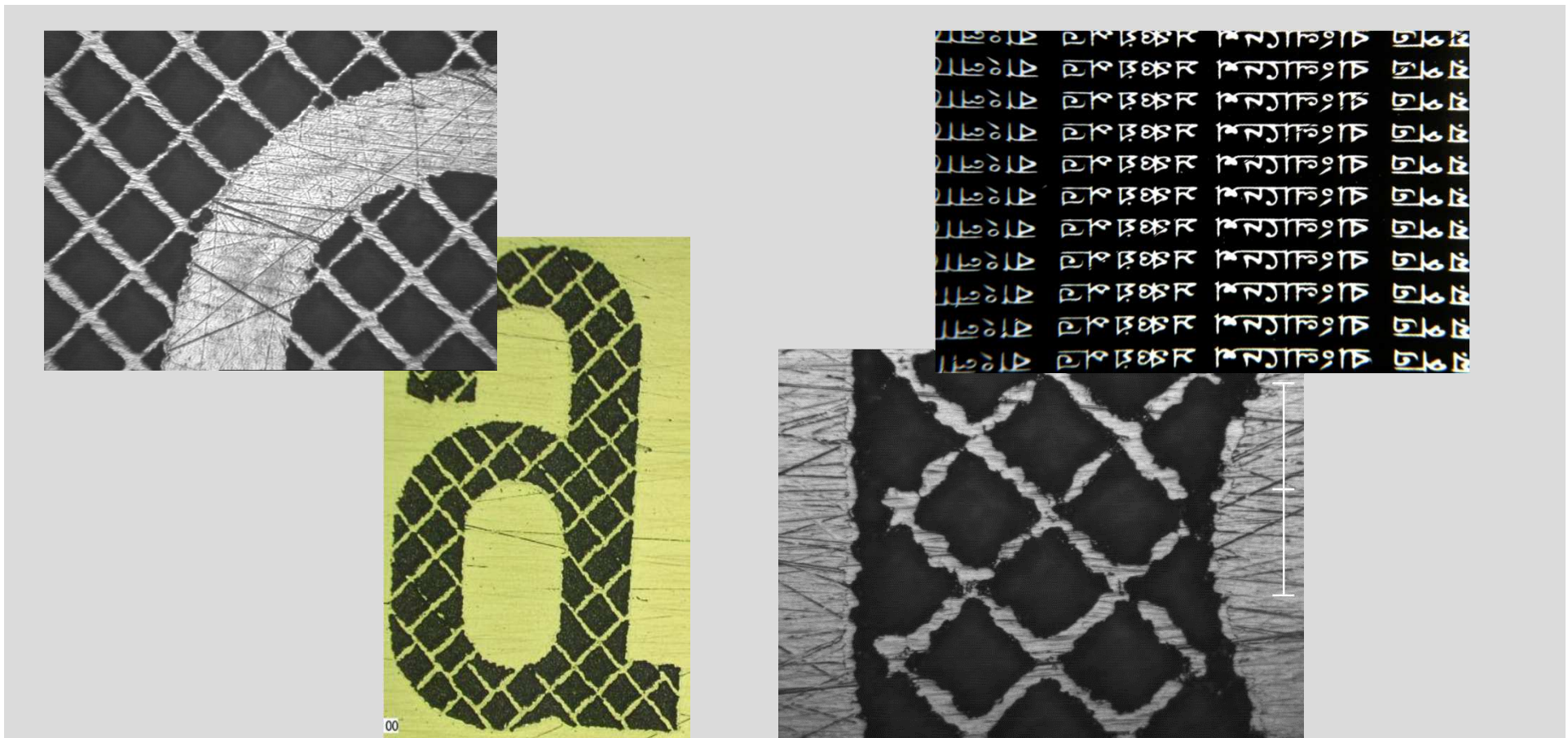
Laser engraving | Schepers Digilas



Laser engraving Schepers Digilas

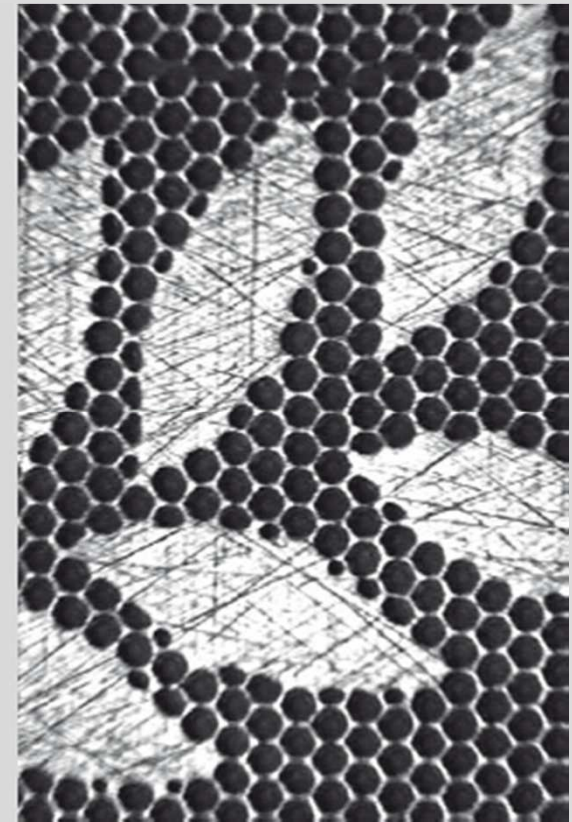
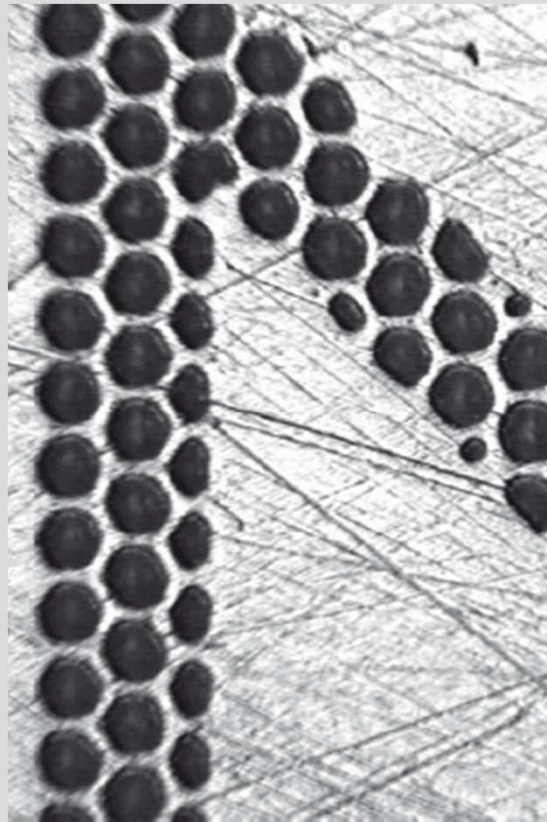
- Direct laser engraving
- Dot size and resolution $< 10 \mu\text{m}$
- Provides special screens, razor-sharp lines at very high quality level
- Engraving direct in copper
- For rotogravure and embossing

Schepers Digilas engraving in copper

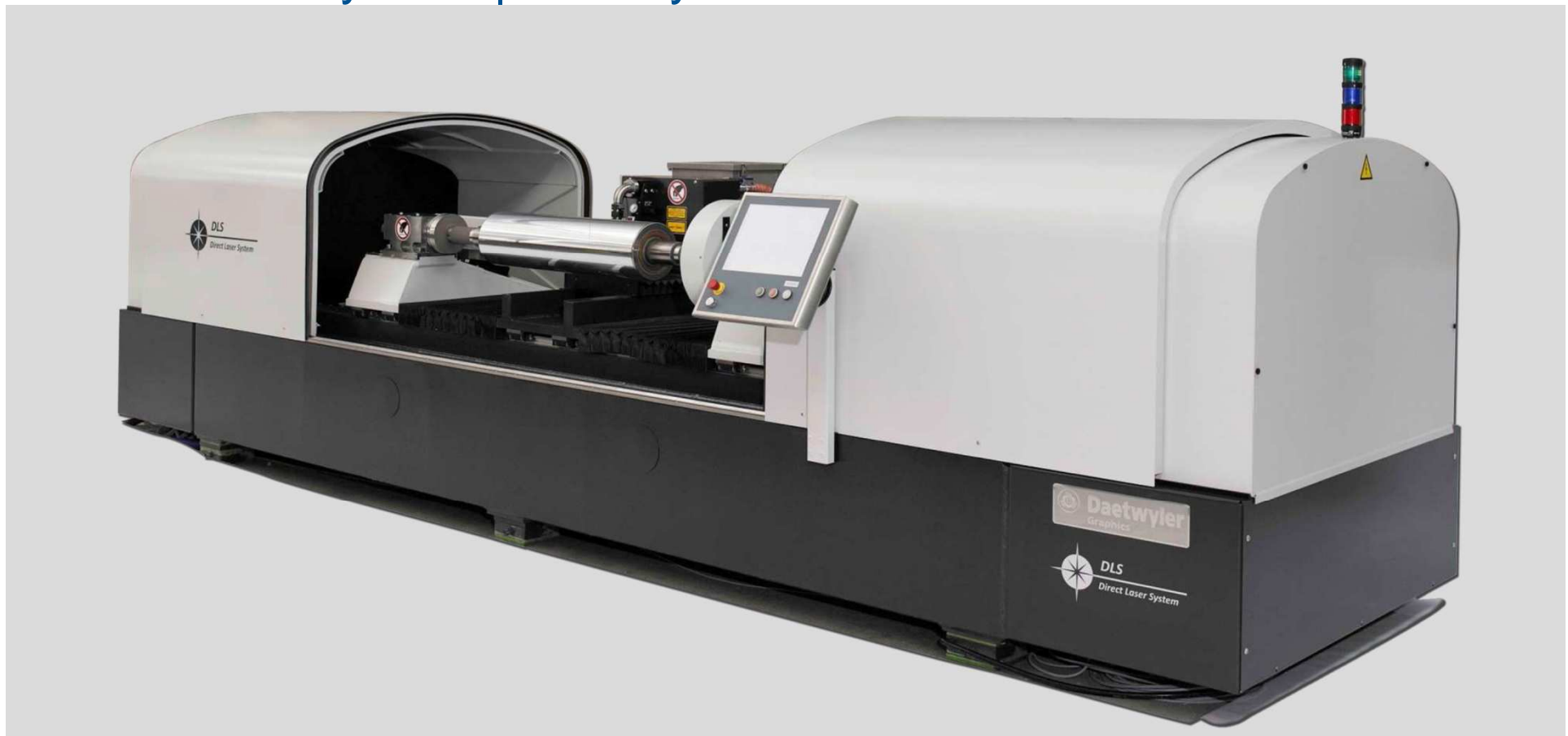


Schepers Digilas engraving in copper

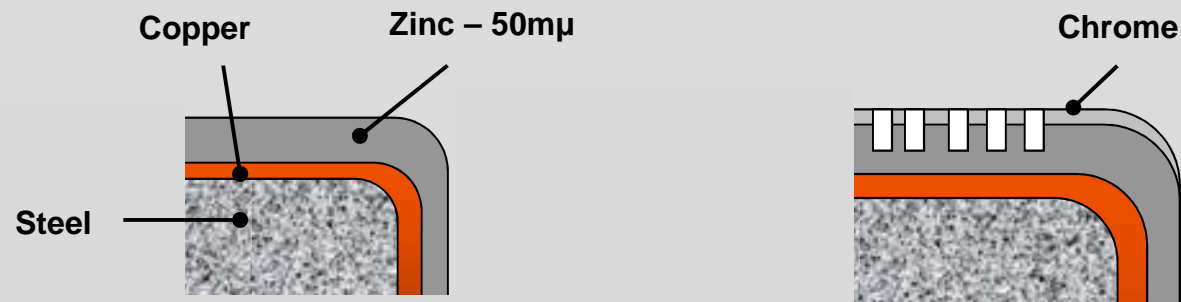
Excellent for line-
work and fine type



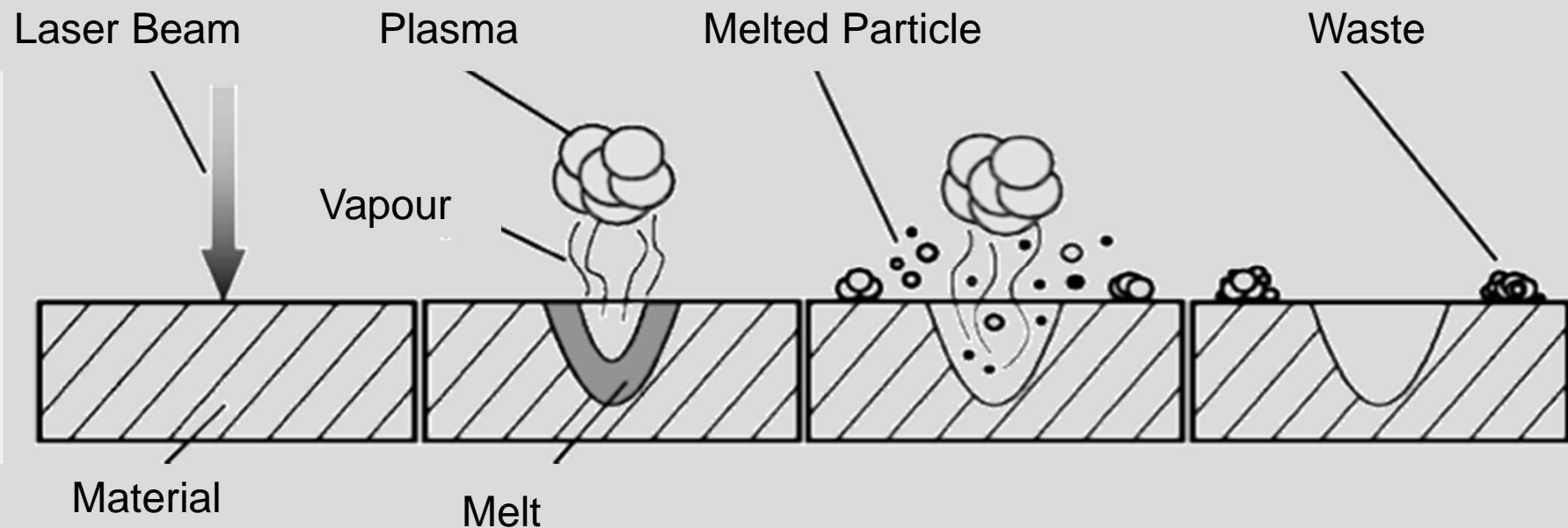
Direct Laser System | Daetwyler DLS



Cylinder built-up I DLS



Laser Material Interaction, Laser direct engraving



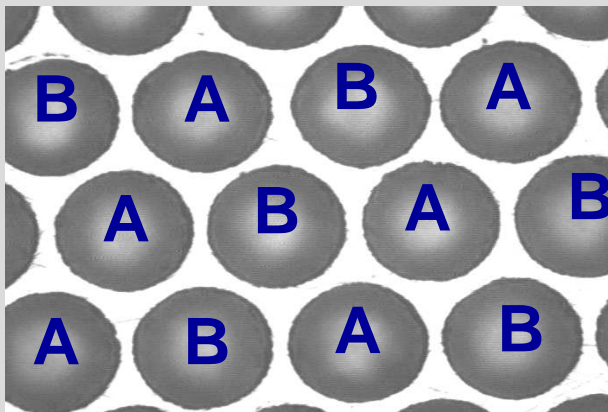
Fritz Klocke, Wilfried König: „Fertigungsverfahren 3 – Abtragen, Generieren, Lasermaterialbearbeitung“, 2007, Aachen, Springer Verlag Berlin

Direct Laser System | Direct Laser Imaging

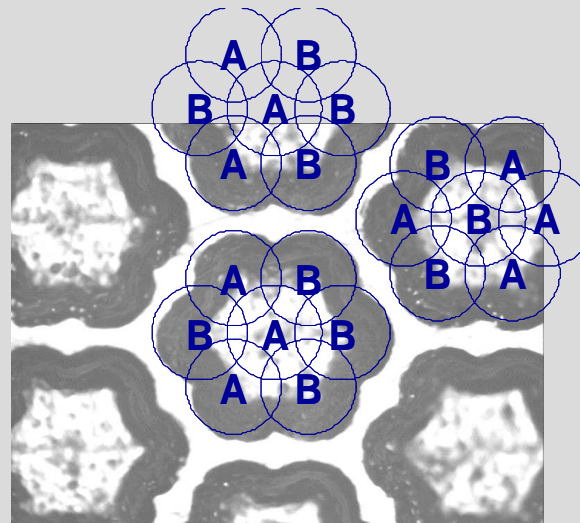


Performance

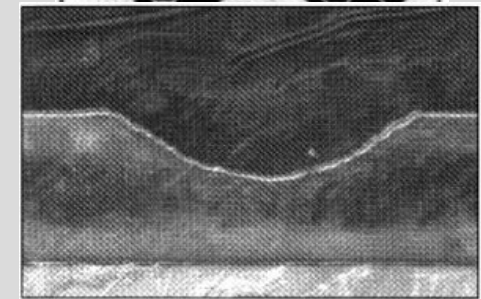
- Engraving Speed: **35,000 or 70,000 cells/s**
- Effective Range of Screen: **30-160L/cm**
(Single Shot and Master Screen)
- Effective Resolution used: **100-400L/cm**



Single Shot



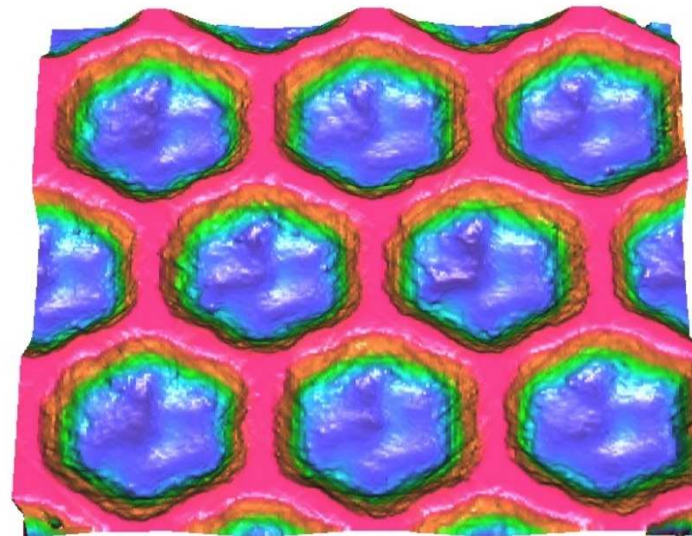
Master Screen



Laser System – Daetwyler DLS



Single Shot

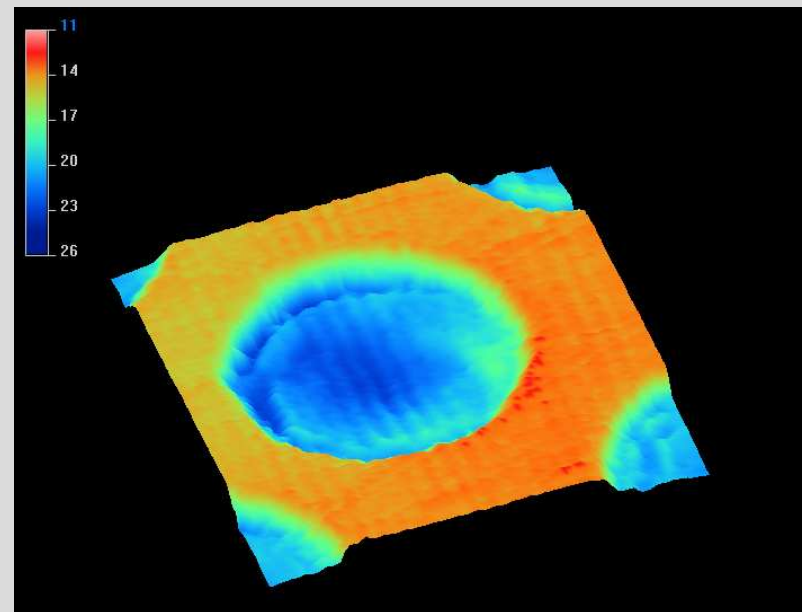


Master Screen

Cell Geometry • Single Shot vs Master Screen

Single Shot

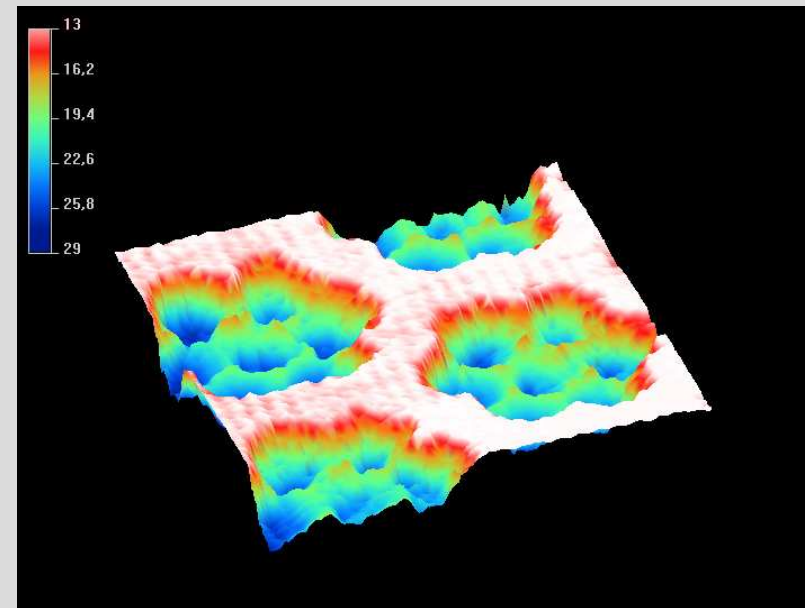
- Screen equals resolution
- Very fast engraving
- Only round cells possible
- Variation in cell types conventional, half-autotypical and super half-autotypical
- Cell depth up to 35µm (in one pass)
(multi passes possible)



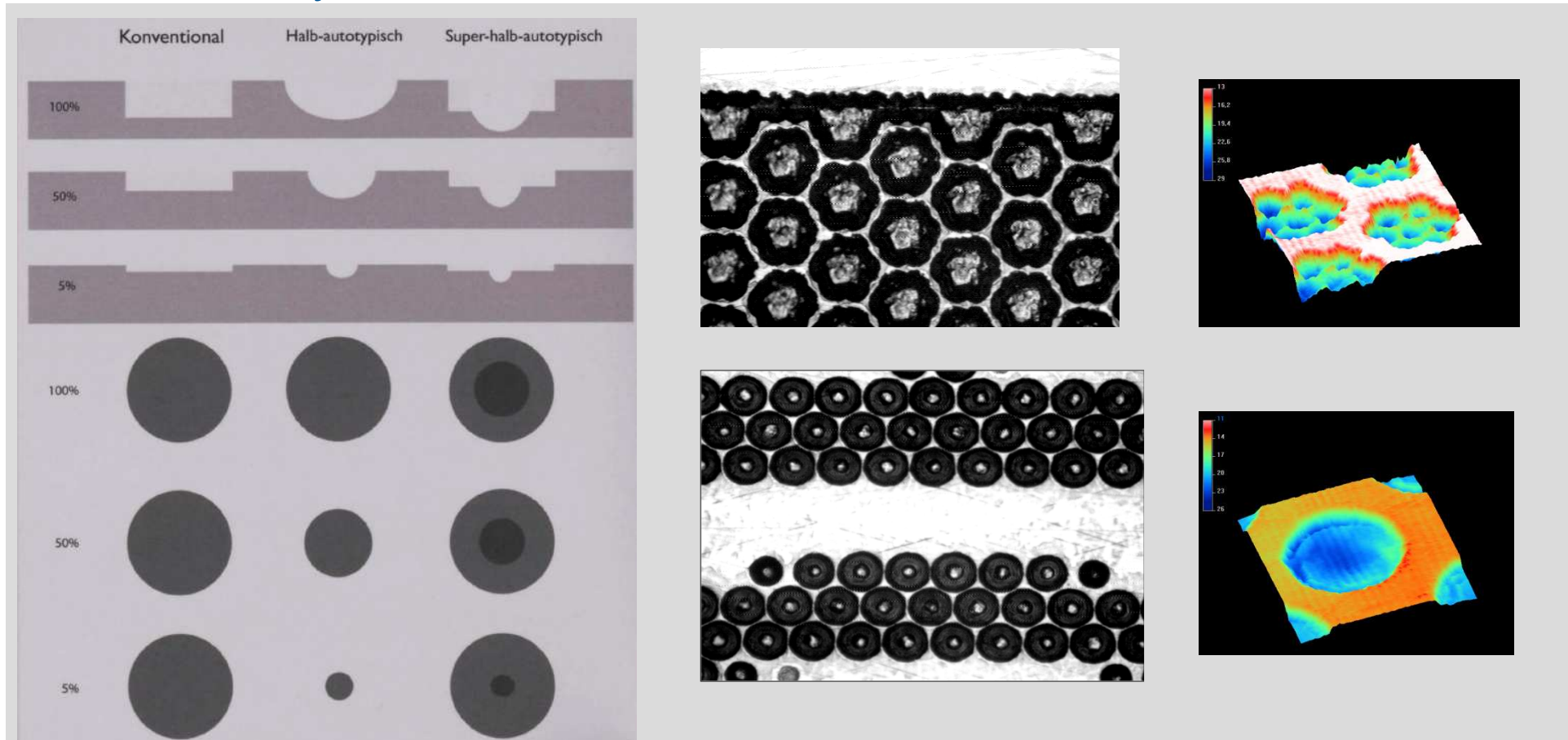
Cell Geometry • Single Shot vs Master Screen

Master Screen

- Resolution higher than screen
(similar to image setter)
- Hexagonal cell
- Variation in cell types conventional, half-autotypical
- Outline possible
- Cell depth up to $35\mu\text{m}$ (in one pass)
(multi passes possible)

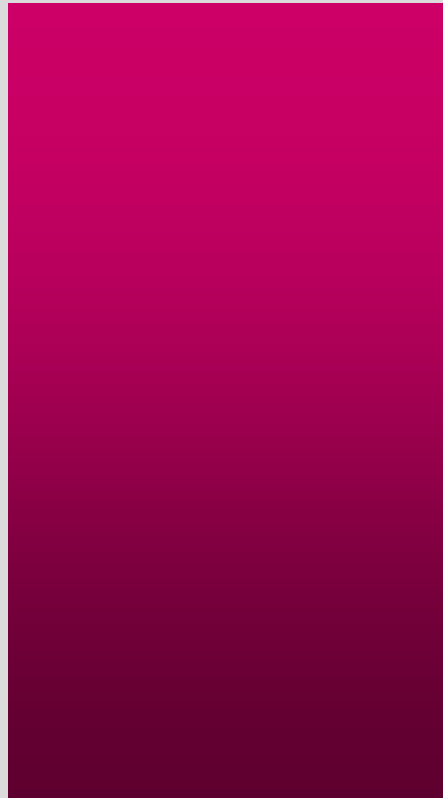


Cell Geometry



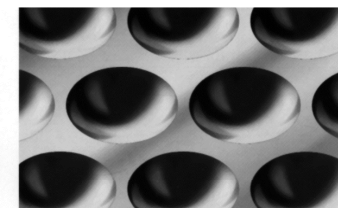
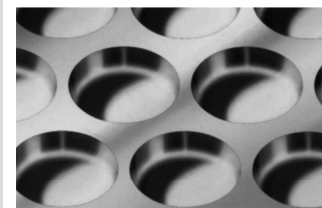
Advantages of Cell Geometry (round)

- Excellent printing results in half-tones and vignettes
- especially on rough substrates which are difficult to print

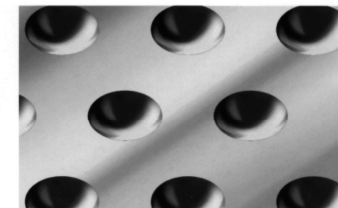
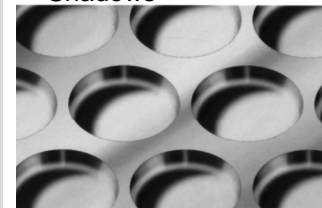


Conventional

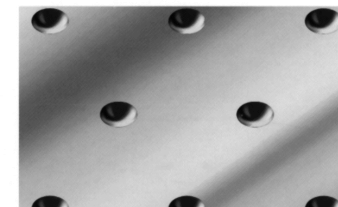
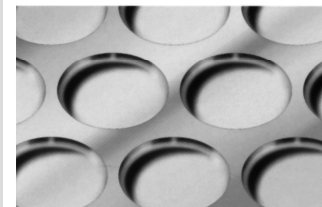
Halfautotypical



Shadows



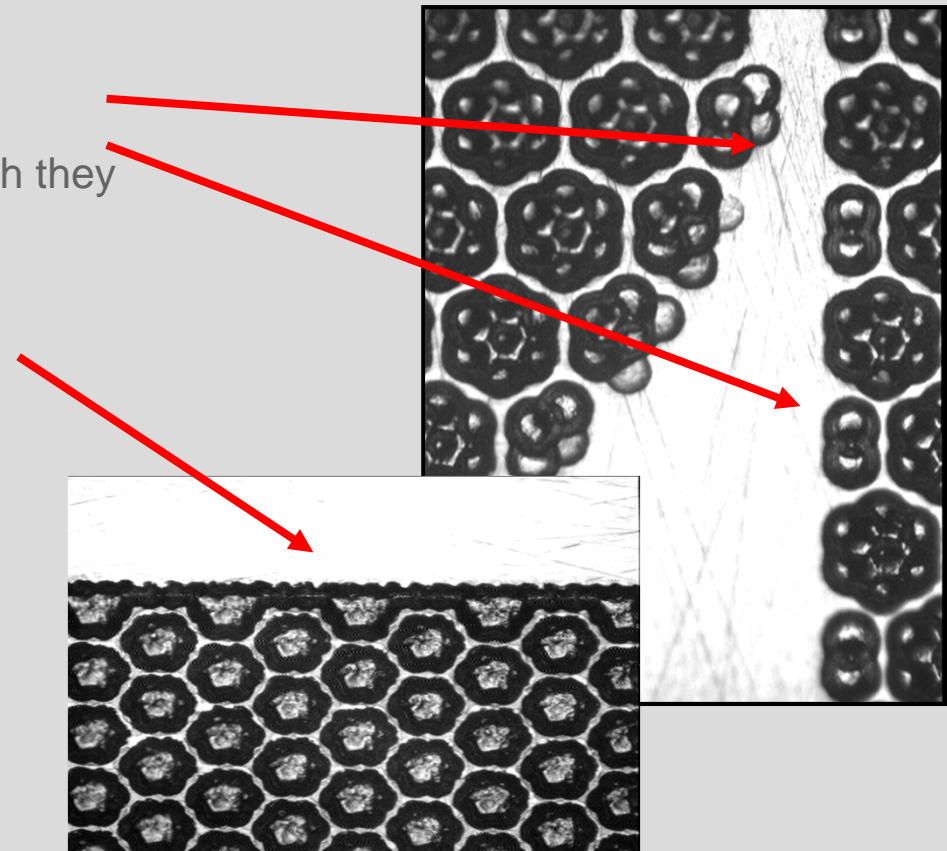
Midtones



Highlights

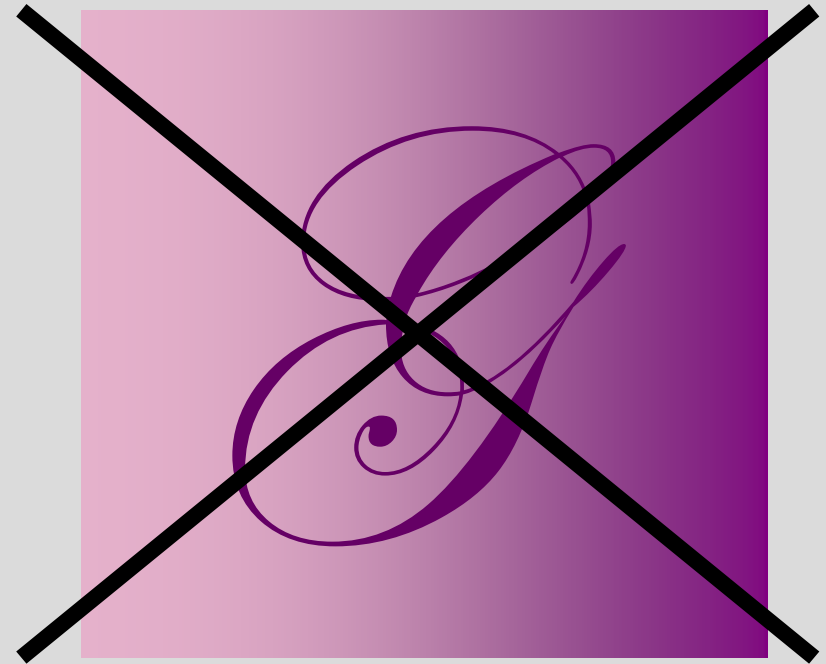
Advantages of Cell Shapes

- Text, forms and designs can be reproduced without limits and will print in excellent quality.
- „Outlines“ can be produced as well, although they are not really needed...
- Offset-Quality with **Gravure Density**...



Advantages of Cell Shapes / Cell Geometry

➔ In the past, combinations of half-tones and fine text on same cylinder was only possible under very limited conditions.



Advantages of Cell Shapes / Cell Geometry

3 cylinders needed to be engraved for best result:

- Full-tone (background color)
- half-tone vignette using electromechanically engraved cylinders
- line-work (fine type) using Laser exposed and chemically etched cylinders

Cylinder 1 - full tone



Cylinder 2 - half tone



Cylinder 3 - Fine type



Advantages of Cell Shapes / Cell Geometry

➔ with DLS we can mix today half-tones and fine elements without any limit, and they can be combined on the same cylinder.



with DLS: 2 cylinders



with former technology: 3 cylinders



Combination of line-work and half-tone, all in 1 cylinder

Ingredients:

Flavor, Butter, Eggs, Yeast, Fruit Extracts,
Vitamin A, Vitamin B, Vitamin C.

**Produced by Janoschka
for our customers.**

fine text, negative in
half-tone vignette

half-tone vignette

fine text, positive

Combination of line-work and half-tone, all in 1 cylinder,
and imaging the same with Chinese Characters...

主料:

香料, 黃油, 雞蛋, 酵母, 水果提取物,
維生素A, 維生素B, 維生素C。

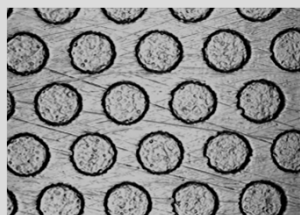
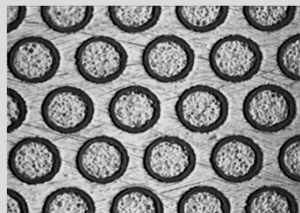
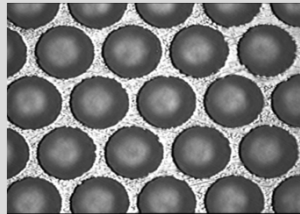
生產雅諾施卡為我們的客戶。

fine characters,
negative in half-tone
vignette

half-tone vignette

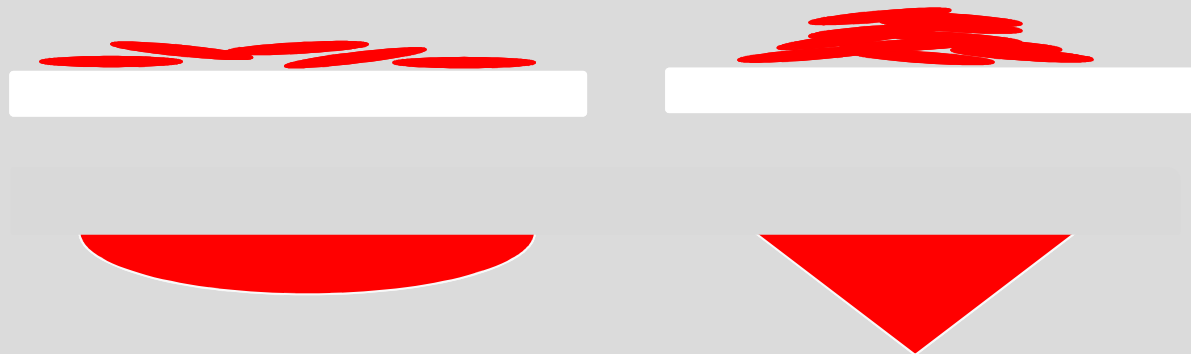
fine characters,
positive

DLS | Ink savings

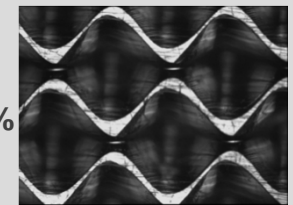


Laser Conv.

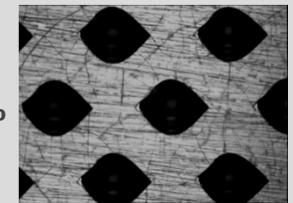
The perfect ink-transfer and the smooth ink lay-down offer our customers significant ink savings.



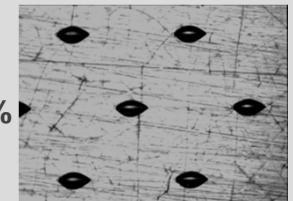
100%



50%

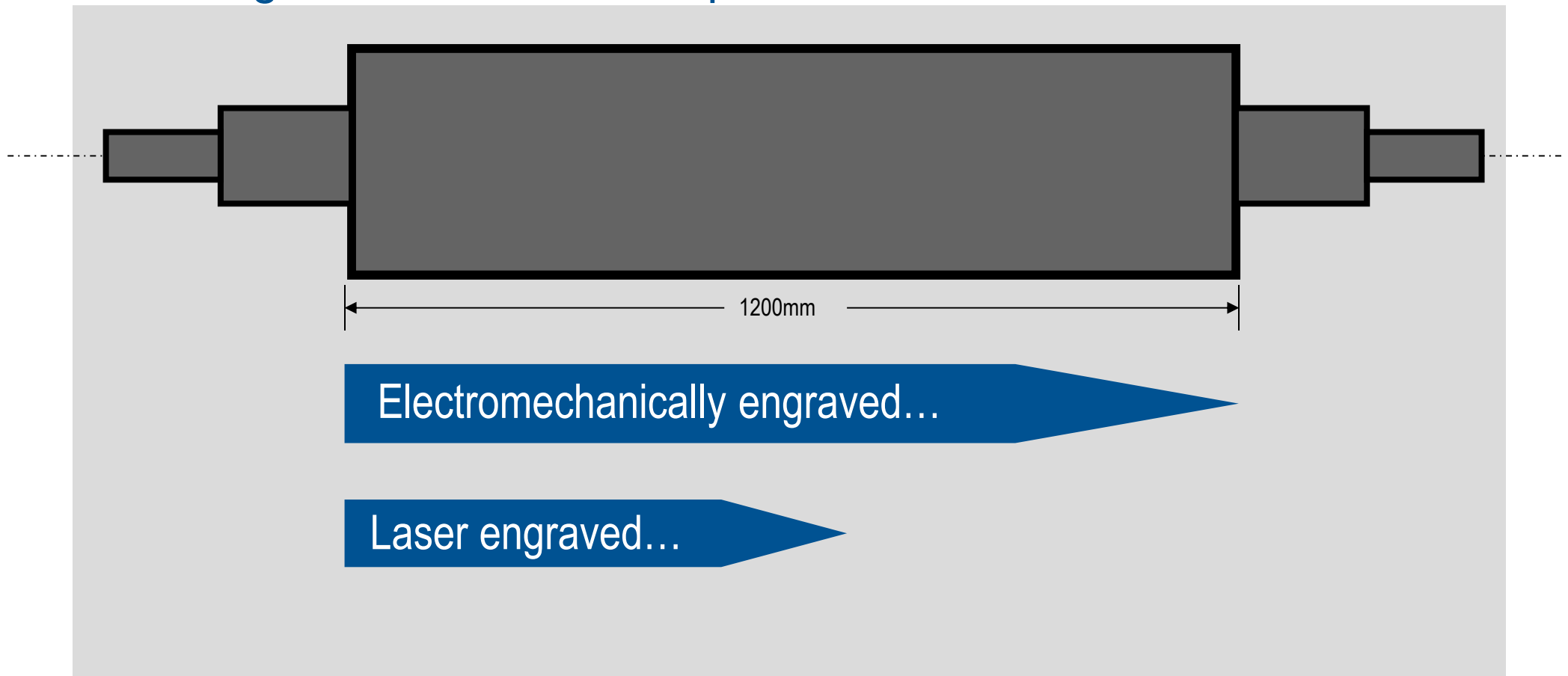


5%



Gravure

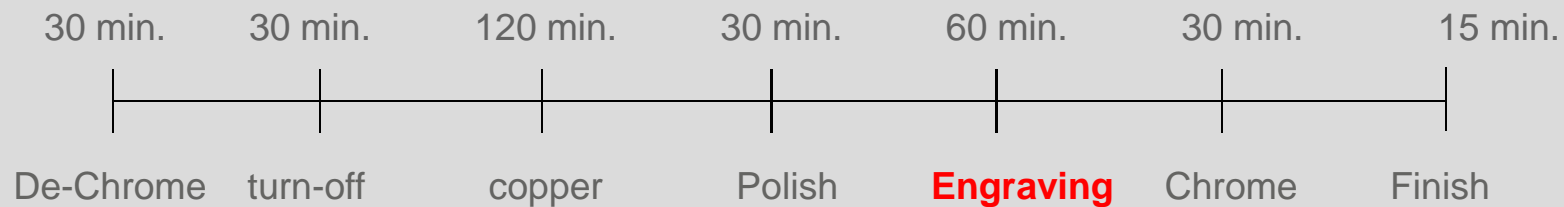
DLS – significant reduction of production time...



DLS – less productions time

■ Electromechanical Engraving

Production steps



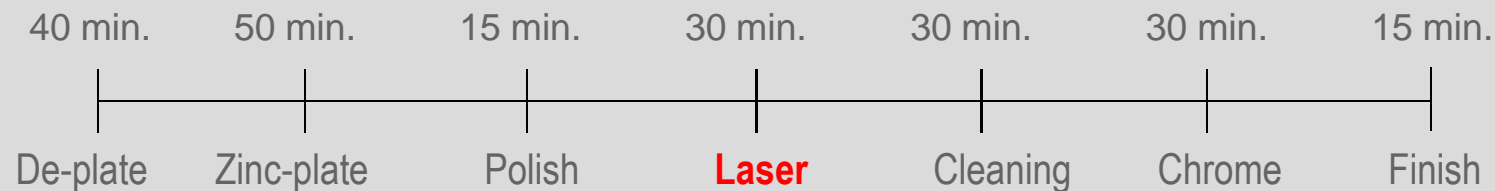
Total time needed: 5 h 15 min.

Engraving Speed: 8.000 cells/sec.

DLS – less productions time

■ Direct-Laser-System

Production steps



Total time needed: 3 h 10 min.

Engraving Speed: 70.000 cells/sec.

DLS – less productions time

- **Electromechanical Engraving**

Total time needed: 5 h 15 min.

Engraving Speed: 8.000 cells/sec.

- **Direct-Laser-System**

Total time needed: 3 h 10 min.

Engraving Speed: 70.000 cells/sec.

→ 2 h 5 min. less / or **40% reduction in production time!**

DLS I Fields of Application - Tobacco

The Direct Laser System has become the ultimate technology in the Tobacco printing industry.



DLS I Fields of Application - Tobacco

- The packaging is the only possibility of communication with the consumer
- Packaging designs have changed from “simple” line-work to multiple color have tones and effects, also implementing special inks and 3D Laquers.



DLS I Fields of Application - Tobacco

- Excellent half-tones and vignettes
- Smooth ink lay-down
- High resolution for fine text elements
- Different cell-geometry and gravure parameters on the same cylinder
- Special inks and substrates
- Fine details without compromising on ink-volume
- No missing dots
- UV Lacquers
- Brand Protection



DLS I Fields of Application - Tobacco

- Tipping Papers (Cigarette Filters) with half-tones
- Printed design has to match with the Packaging



DLS I Fields of Application - Tobacco



Fields of Applications I Pharmaceuticals

- Fine text and elements in combination with half-tones



DLS I Fields of Application – difficult Substrates (Metallic PET)

Engraved



Laser Masterscreen



DLS I Fields of Application – difficult Substrates (Metallic PET)

Engraved



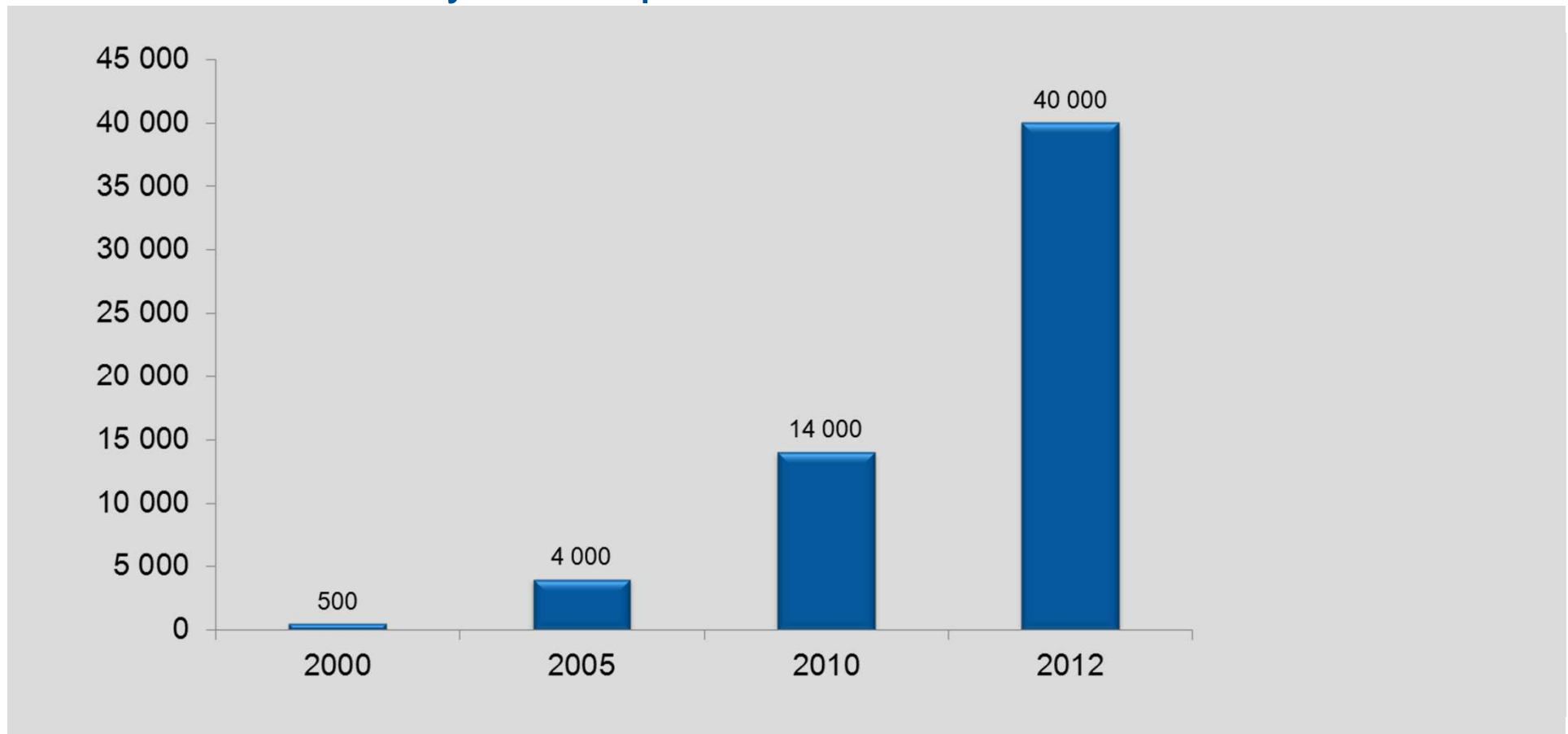
Laser Masterscreen



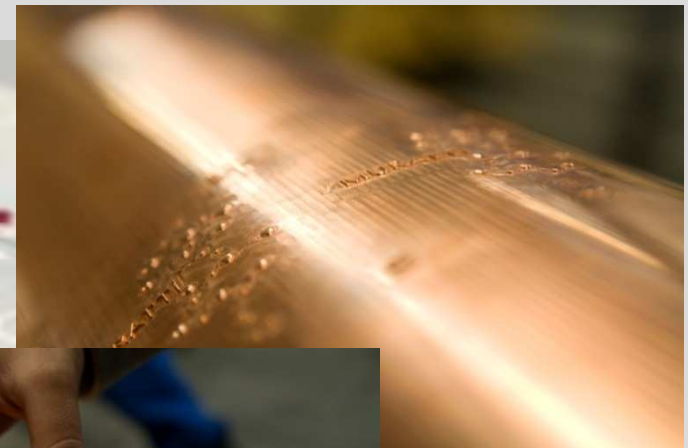
Janoschka | Laser Systems installed world-wide



Number of Laser Cylinders produced



New and other Applications of Laser Technology I Embossing

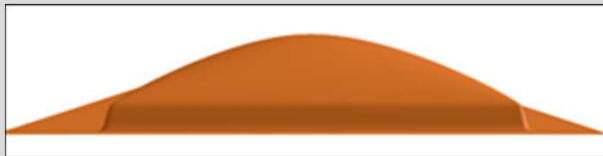


3D Embossing

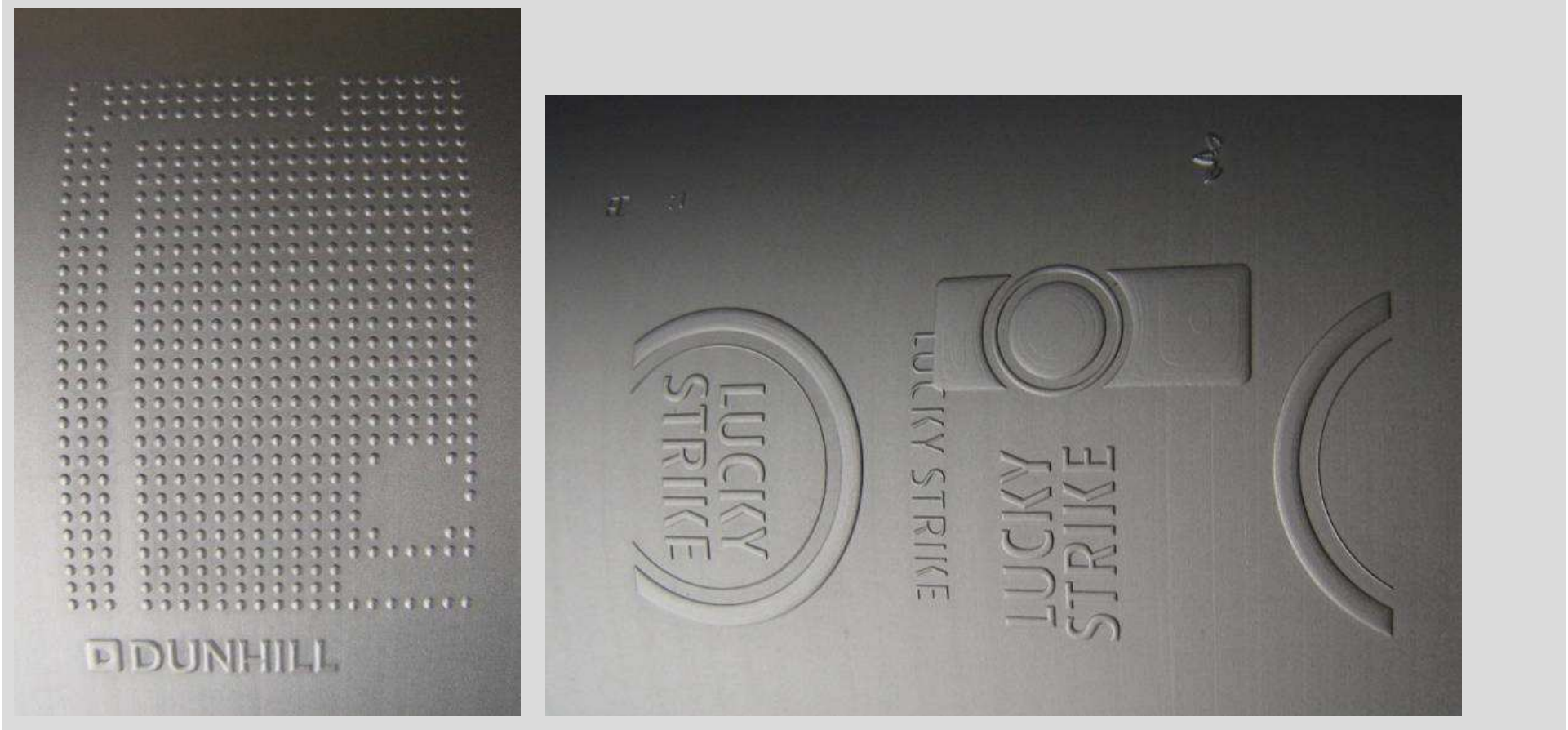
CNC technology



Laser technology



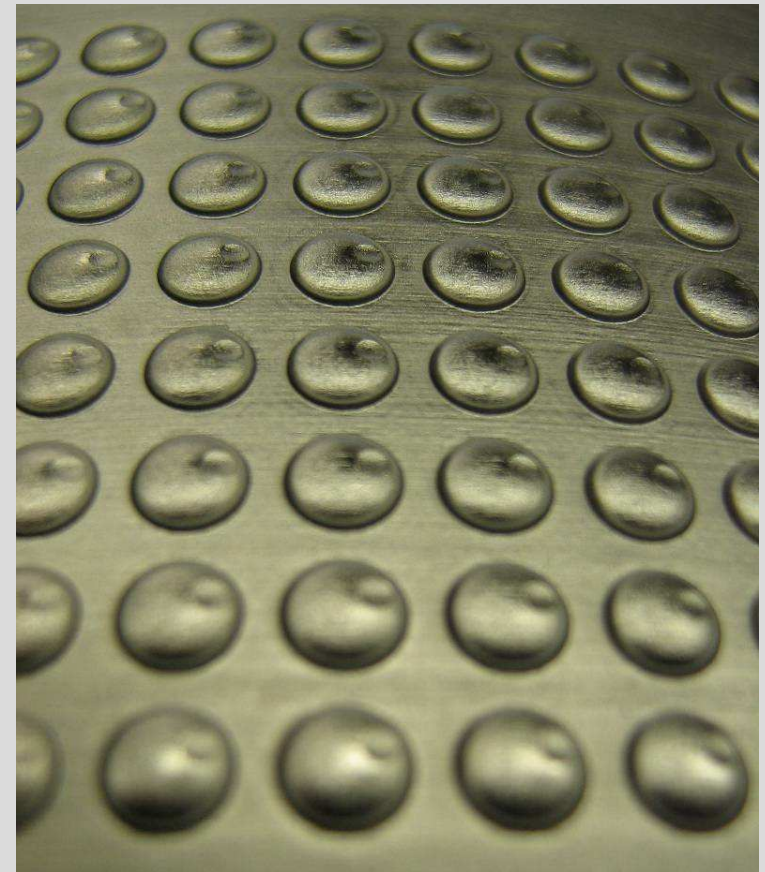
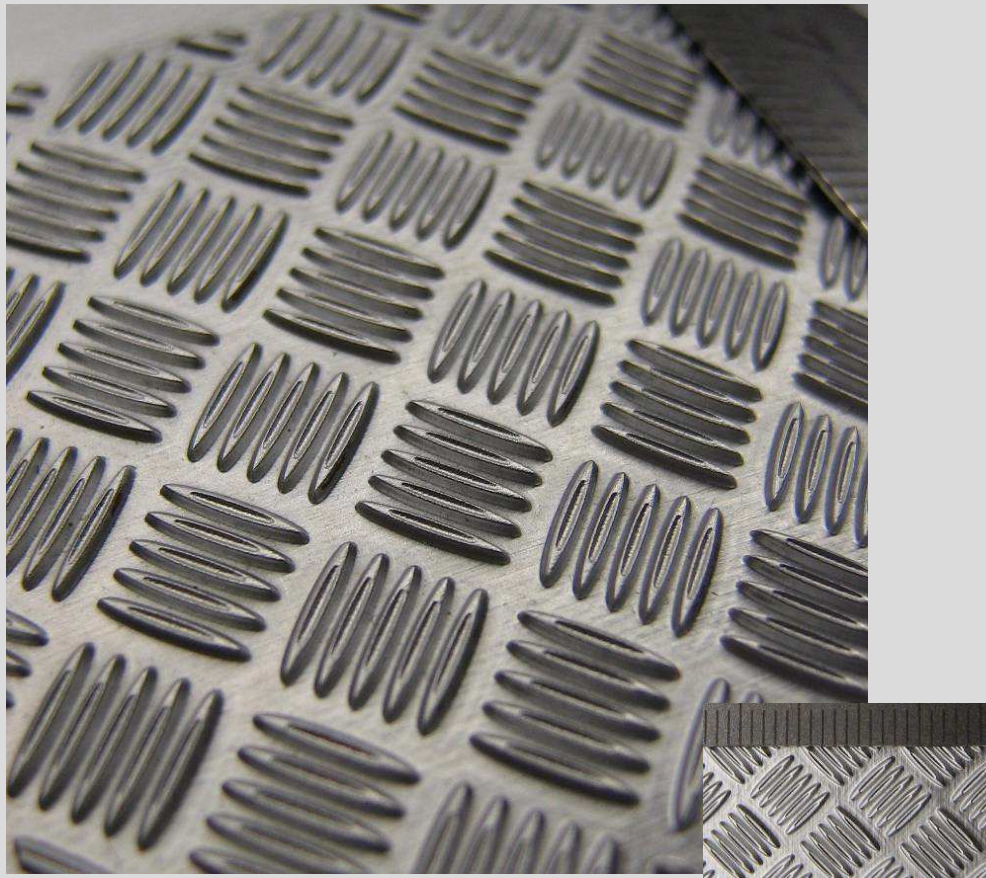
3D Embossing



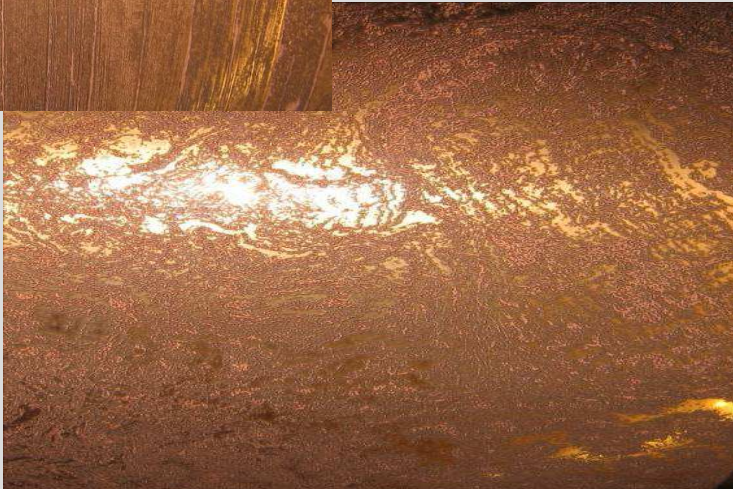
3D Embossing



3D Embossing



Structures: Wood



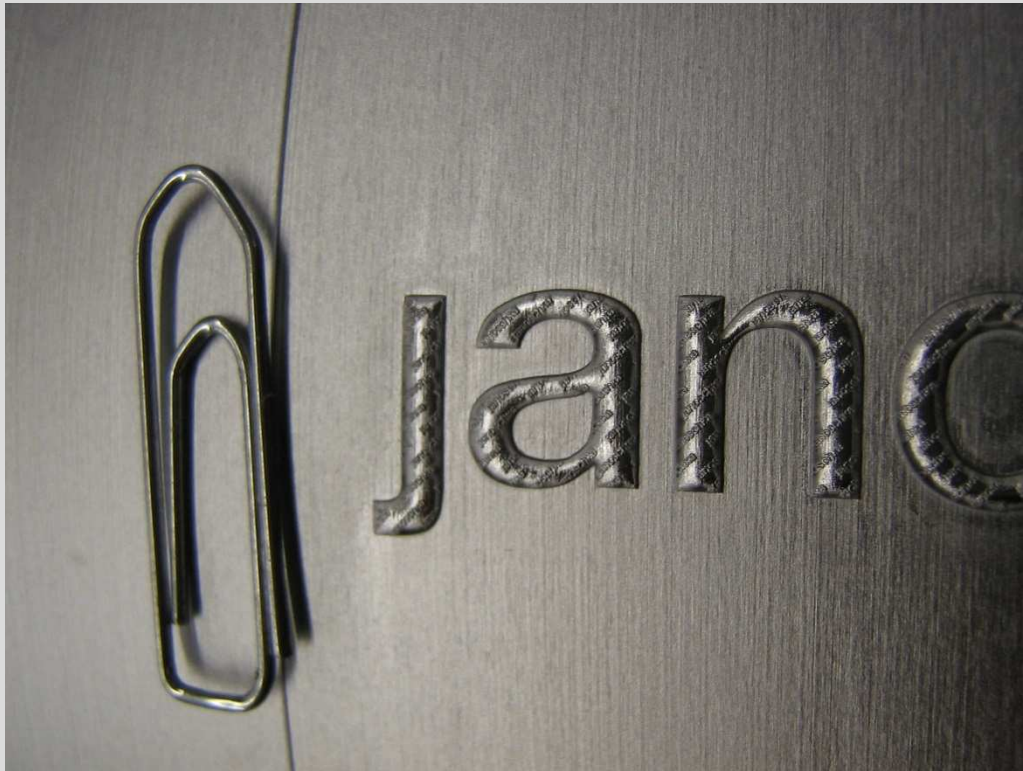
Structures: Leather



Structures: Pictures



Micro-embossing with Laser Technology



Micro-embossing with Laser Technology



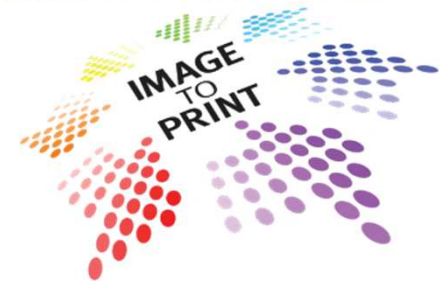
New Challenges

Bring these worlds together





The Future is Laser



Thank you for your attention !

Rudi Weis-Schiff

27.11.2013

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