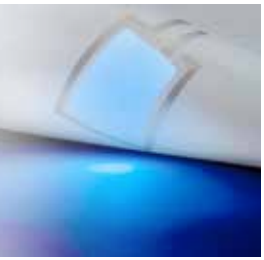
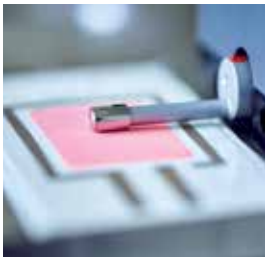
binder ITZ
Innovations- & Technologie Zentrum

PRINTED ELECTRONICS






WHO WE ARE AND WHAT WE DO

binder Innovation and Technology Center in Bad Rappenau, Germany performs research and development in the field of printed electronics. The main focus is on development of new technology, products and processes in the high-tech sector.

Printed electronics is a promising part of microelectronics, in which electronic devices are created by different printing techniques.

The ITZ focuses on functionalising 3D surfaces in a direct additive process including the related conventional control electronics.

Using the binder process, different material surfaces can be coated, i.e. commercially available paper.

BINDER ITZ | PRINTED ELECTRONICS

PHOTOS: STEFFEN WALTER STUDIOS

ABOUT THE BINDER GROUP

binder is a traditional family company and one of the market leaders in the area of circular connectors for industrial and automation technology.

The binder Group is based in Neckarsulm, Germany, and has 1,400 employees at 13 locations worldwide. These include Germany, Austria, Hungary, Switzerland, France, the Netherlands, the UK, Sweden, China, Singapore and the USA.

Eight subsidiaries and five affiliate companies are part of the corporate group. In addition, binder works with 45 sales partners worldwide.

The product range includes not only industrial connectors, but also plugs for sensor, automation and medical technology. LED lights extend the product portfolio. Implementing individual customer requests is one of binder's strengths. The products are used in agricultural, construction machinery and signal equipment.

THE BINDER PROCESS

Functionalising 3D surfaces in a directly additive process.

Printed electronics is a recent and very innovative technology in which electronic components are applied with prining techniques. With the binder method components are printed directly sheet-to-sheet on the final item. This eliminates process steps in comparison with conventional production processes.

PHOTO: BINDER ITZ

BINDER ITZ | PRINTED ELECTRONICS

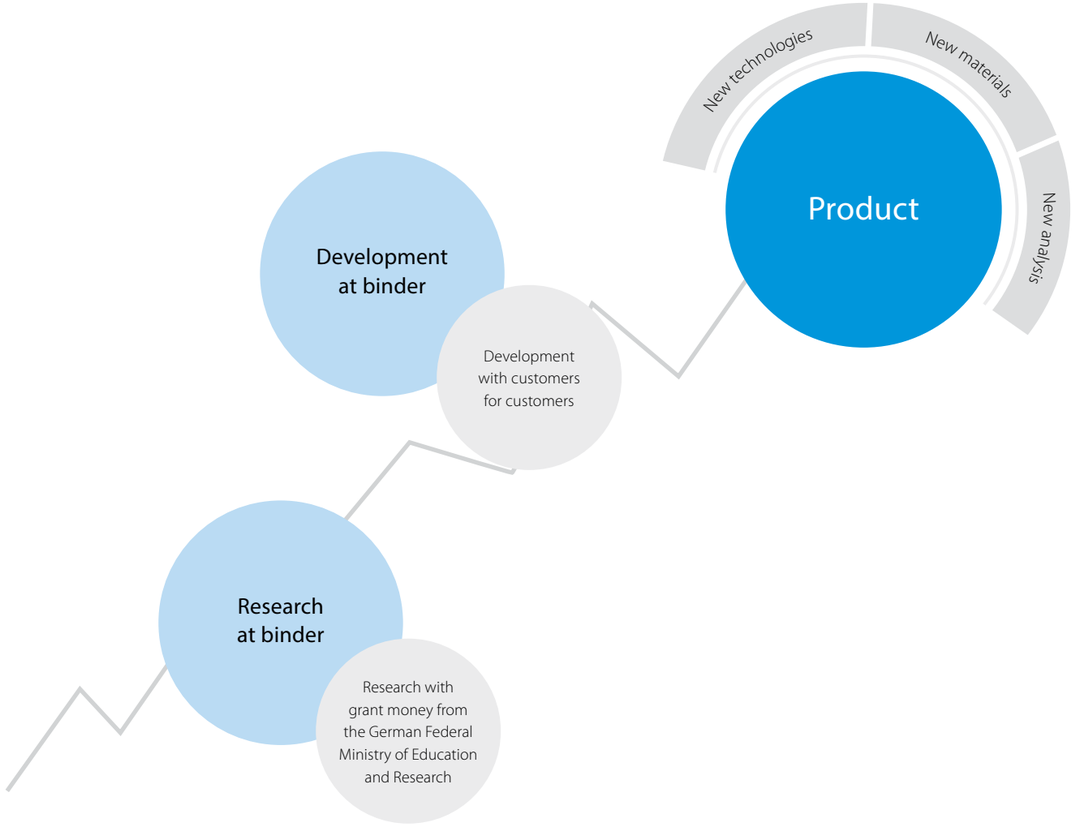
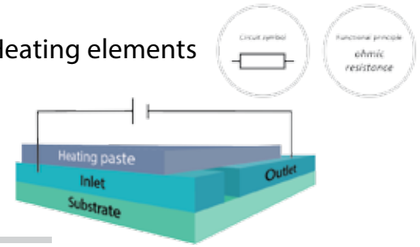


PHOTO: STEFFEN WALTER STUDIOS

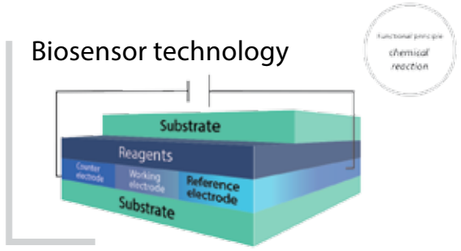
OPPORTUNITIES WITH PRINTED ELECTRONICS

At the binder ITZ, research on the manufacture of electronic components is being done with one of the most precise manufacturing processes of the future.

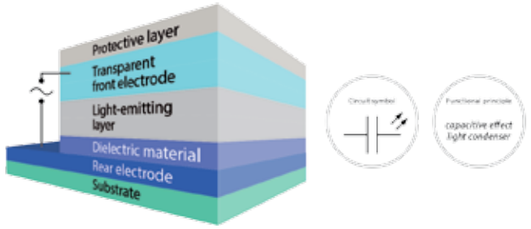
Heating elements



Biosensor technology



EL
(electroluminescence)



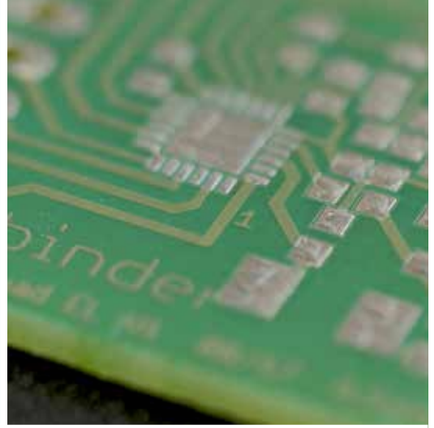
PHOTOS: STEFFEN WALTER STUDIOS

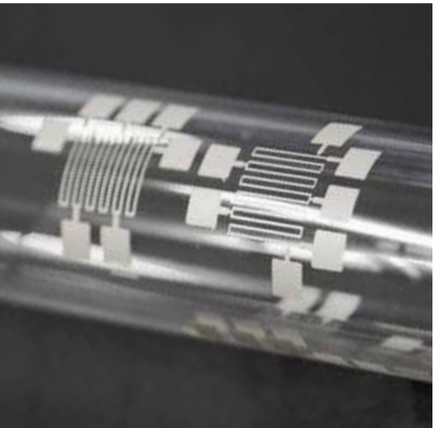
Where and how can surfaces be functionalised with the binder process?

- **Information**
  Printed light symbols
- **Lighting**
  Printed EL lights
- **Operation**
  Printed sensor buttons
- **Measurement**
  Printed sensors
- **Heating**
  Printed heaters

Areas in which printed electronics have already been applied successfully:

- Batteries
- Heating elements
- OPV (organic photovoltaic)
- Biosensor technology
- EL
- OLED (organic ligth emitting diode)
- Piezoresistive pressure sensors
- FET (field effect transistor)
- Antennas and RFID





PHOTOS: STEFFEN WALTER STUDIOS | BINDER ITZ | SHUTTERSTOCK

POSSIBLE FIELDS OF APPLICATION

EL DEVICES

- EL devices consist of several very thin layers.
- A light emitting layer is sandwiched between two electrodes and excited by alternating current.
- The printed lights are glare-free and have a long lifetime. A wide variety of colors makes them interesting for modern lighting design concepts.
- Due to their very low failure rate, they can be used where utmost reliability is required.
- binder EL lights can be used in modern display systems, e.g. to illuminate safety symbols. With the direct printing process, not only conventional plastics such as polycarbonates or polyester can be printed, but also unusual substrates such as stone, glass or commercially available paper.

Possible application areas:

- Automotive industry
- Packaging industry
- Medical technology
- Electrical technology
- Machine tool construction

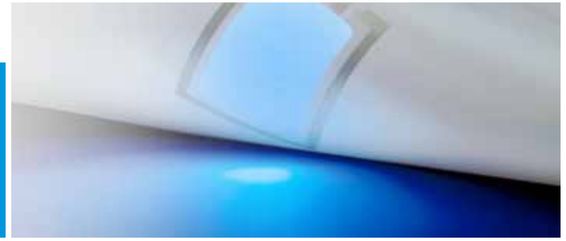


PHOTO: STEFFEN WALTER

PRINTED HEATING ELEMENTS

- Any conductor generates heat if current is passing through. This effect can be used in a specific manner in order to print inexpensive, highly efficient heating elements.
- Using the tampon printing process, customer-specific heating elements can be printed directly onto substrates. The use of additional carrier films or complex adhesive processes is eliminated completely.
- The use of new nanomaterials makes it possible to create product characteristics such as transparent, conductive layers.
- The highest requirements in terms of biocompatibility and safety can be met.

Possible application areas:

- Aerospace
- Medical technology
- Biotechnology
- Consumer goods industry
- Measuring technology

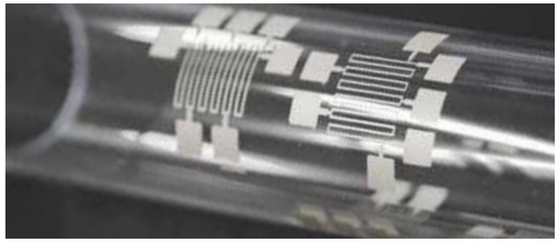


PHOTO: BINDER ITZ

PRINTED SENSOR TECHNOLOGY

- Prevention of any distortion from adhesives or carrier layers by printing directly on the object to be measured. Therefore very precise measurements result.
- Successful projects have already been carried out in the area of capacitive sensor technology. The combination of printed sensors and printed display elements enables direct feedback.
- New functions can be realised by integrating printed sensors and actuators.
- Resistive, optical and thermoelectric measurement principles are intended for the next generation of printed sensors.

Possible application areas:

- Medical technology
- Biotechnology
- Mechanical engineering
- Automation technology
- Industrial science, e.g. human-machine interfaces

PHOTO: BINDER ITZ

CUSTOMISED ELECTRONIC SOLUTIONS

- Development of customised electronic solutions.
- Light technology parameters for each printed light segment can be adjusted individually.
- Development time is shortened dramatically by using initial samples based on rapid prototyping in early phases of the project.
- Everything from a single source: starting by circuit drafting and layout to prototype tests up to series production.

Possible application areas:

- Branches of printed electronics
- Machine and equipment construction
- Automation technology

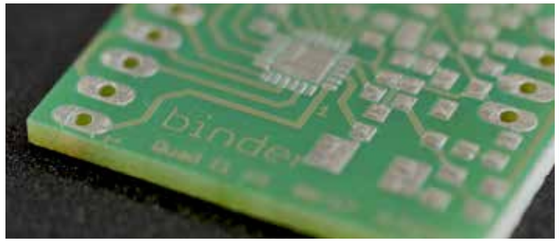


PHOTO: BINDER ITZ

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