WEIDMANN

Medical Technology

Enhancing Medical Manufacturing with RFID Technology

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WEBINAR

Enhancing Medical Manufacturing with RFID Technology

Explore RFID’s role in enhancing efficiency and traceability in medical manufacturing

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Content

Introduction of Weidmann Medical

- **Leading developer and manufacturer**: Specializes in innovative, high-quality medical plastic injection molding components
- **Expertise**: Longtime experience in injection molding systems for Life Sciences industry
- **Core competence**: Focus on product idea implementation, industrialization, global production, and distribution
- **Technological innovation**: Combines product technology, production processes, and medical plastics to provide custom-made solutions
- **Global presence**: Serving leading companies worldwide in the dynamic MedTech industry
- **Market segments:** 65% Diagnostics (IVD) & Medical Devices, 35% Pharma/Drug Delivery
- **Part of the Weidmann Group:** A leading global supplier of engineered products and services in the Electrical, Medical/Pharmaceutical and other selected industries

Key Metrics (2023)

- **200** employees
- **8,800 m²** total clean room area
- **ISO 5, 7 & 8** clean room classes
- **84** injection molding machines
- **24/7** production
- **+1,500,000,000** units/year

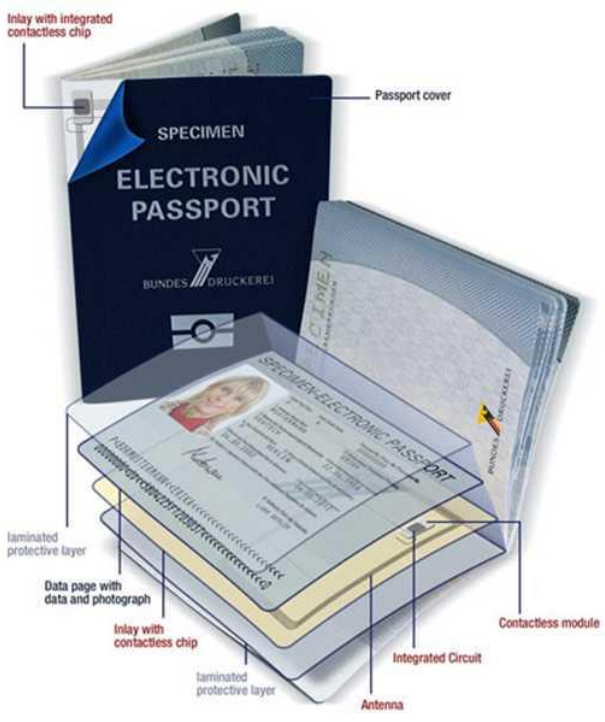
Content

Development of RFID Technology

- RFID (**R**adio **F**requency **Id**entification) goes back to the invention of RADAR
- Harry Stockman laid the foundation for today's RFID applications in 1948 in his publication "Communication by Means of Reflected Power"
- Passive transponder technology was already used in the last world war for friend or foe identification
- The technology has been used commercially in the systems we know today since 1979.

RFID Technology Today

Today's applications are complex and hard to imagine life without them



Pay

RFID Basics and Areas of Application

Software Data Storage

Reader/Writer

RFID

[B Medical Systems]

- RFID or NFC offers the great advantage that no separate energy supply is required.
- The system is activated by the reader, or the transponder draws its energy from the reader's electromagnetic field (passive RFID)
- The system can read out data or upload new data

RFID Tag or Transponder

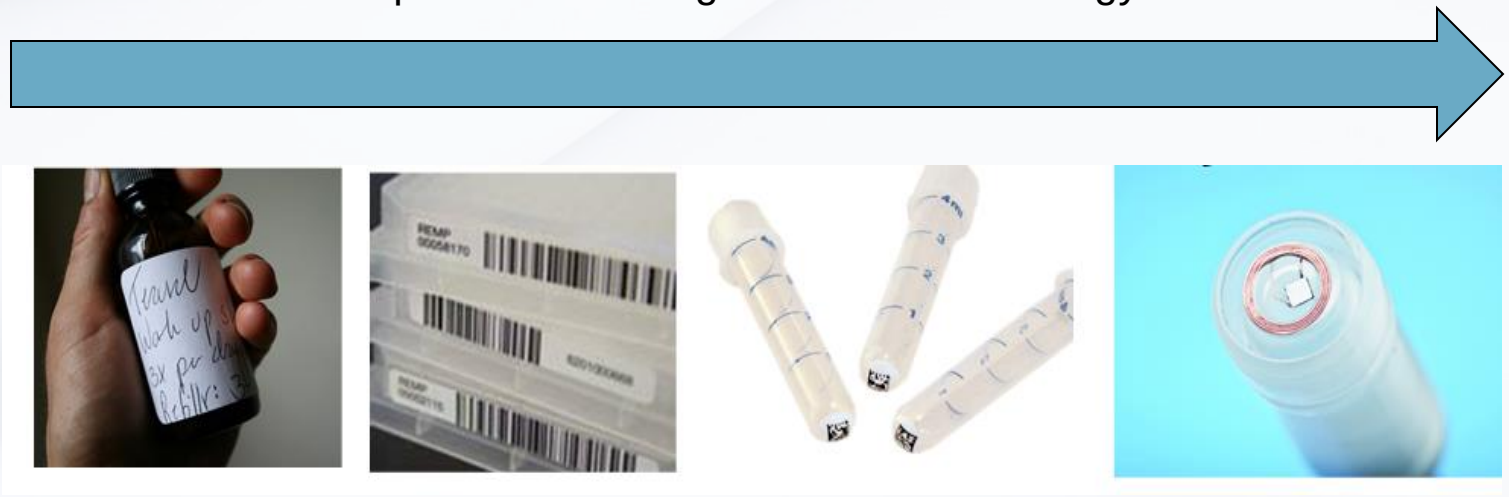
Integrated Circuit (IC) and Antenna

- Three different frequency ranges are mainly used today:
  LF transponders (125/134 kHz),
  HF transponders (13.56 MHz),
  UHF transponders (868/915 MHz)
- Weidmann concentrates on the use of HF and UHF transponders
- Transponders cover a wide range of security features (Clothing to Pay Card)
- Main factor for read range are antenna size and used reader
- Memory ranges from a few bits to 16kbit

Content

Advantages of RFID in Consumables

Development of labeling in medical technology



Handwritten label | Barcode | QR Code | RFID Tag

- It is clear to see that the amount of data that is fed to the consumables is constantly increasing
- Digitization and automation in laboratories, hospitals and doctors' surgeries is increasing and requires corresponding data carrier

Advantages of RFID in Consumables

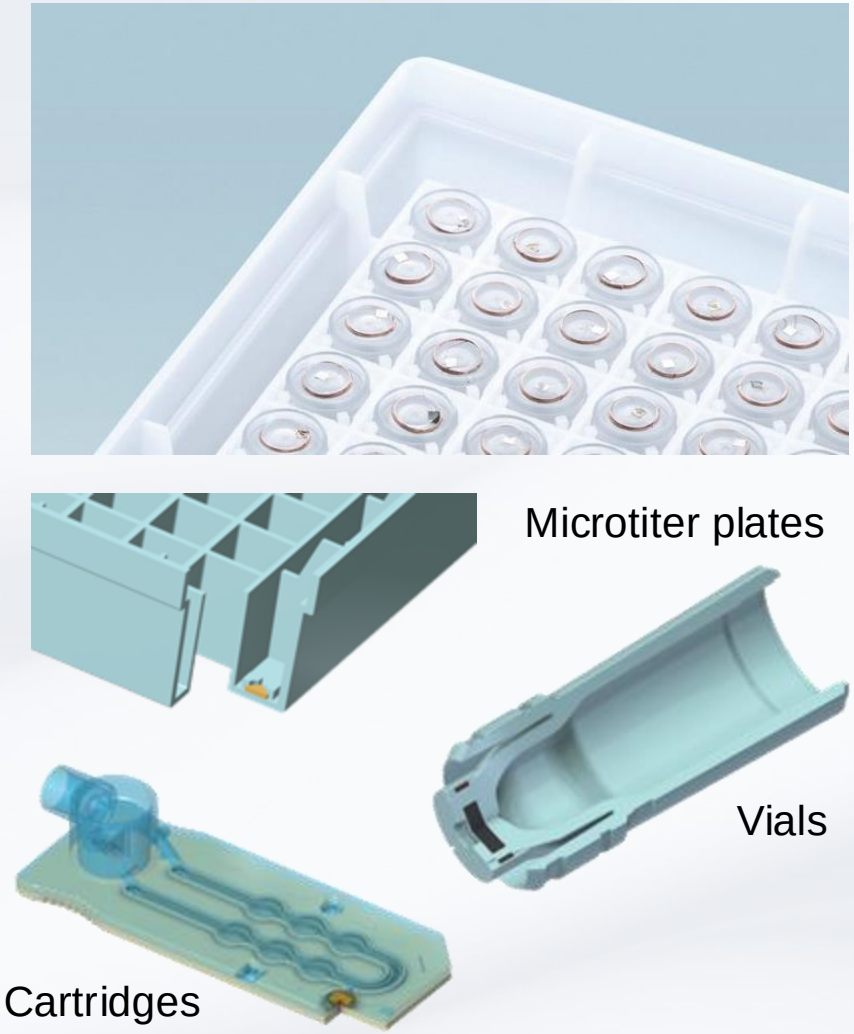
- Localization of samples in the laboratory, online information about contents etc.
- High storage capacities for seamless documentation with "data on board" and thus risk minimization
- Seamless and reliable traceability of storage and process conditions
- Economical and fast data storage for medication information

Weidmann Medical works closely with KTS (Kommunikationstechnik und Systeme GmbH)
to integrate customized solutions

KTS SYSTEME

Trends RFID Applications

RFID Integration Examples



Application areas

- Auto injector, pre-filled syringe closures, cartridges, patch-pump, racks

Technical benefits

- Information storage during the life cycle of a product
- Storing individual information on every single component
- Combination with sensors is possible e.g. temperature-, humidity-monitoring
- Fully traceability in the entire supply chain

Patient benefits

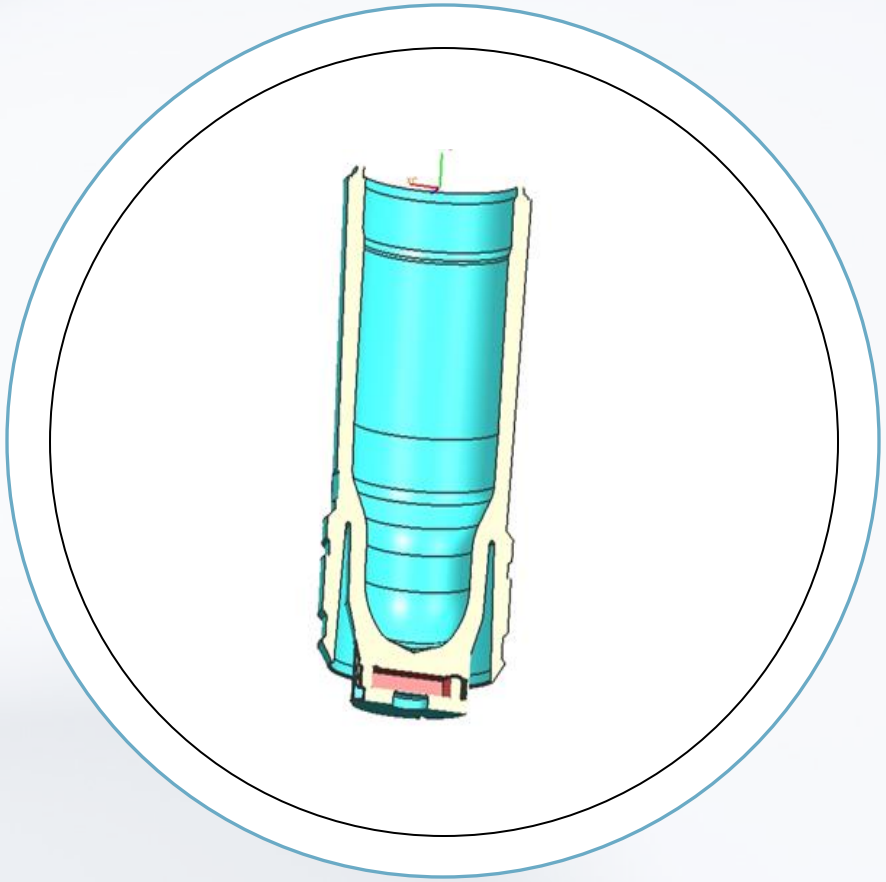
- Reduce the risk of application errors in hospital
- Improve therapeutics at-home care for chronic illnesses
- Connect devices and easy track of self-administration

Content

Overmold Procedure

RFID In-Molding at Weidmann

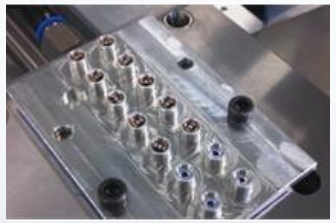
- Compared to a wet inlay, semi encapsulated solutions and even complete encapsulated RFIDs are possible (2 shot injection molding)
- Optimal security against damage and loss of the transponder can be achieved
- RFID transponders with an antenna diameter of ≥ 5 mm can be integrated automatically. Transponders with integrated antenna are recommended for smaller parts dimensions



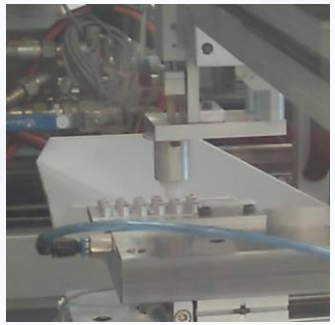
Overmold process

Overmold Process Flow

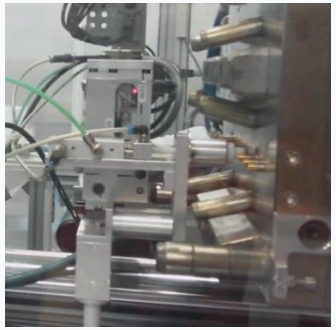
Separation of the RFID in the transfer station



RFID pick-up in the placement robot

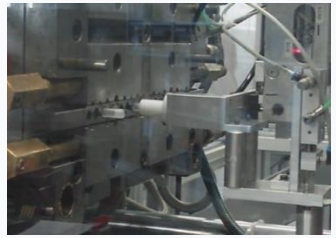


Insertion process in the injection mold



Injection molding process

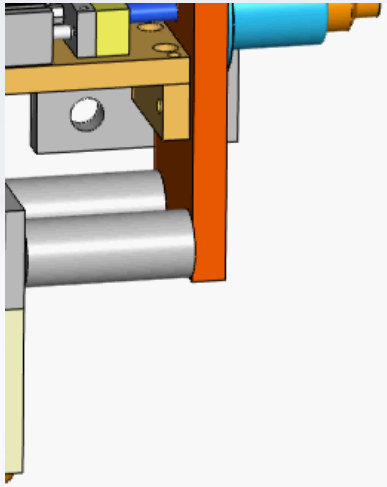
Removing the parts

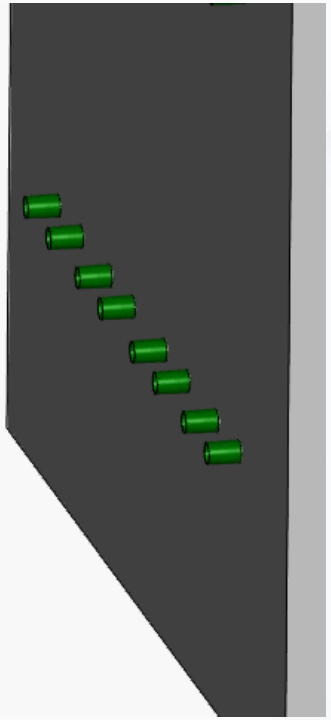


- RFID transponders with an antenna diameter of ≥ 5 mm can be automated
- Transponders with an integrated antenna are recommended for smaller dimensions

Insertion Process

Animation





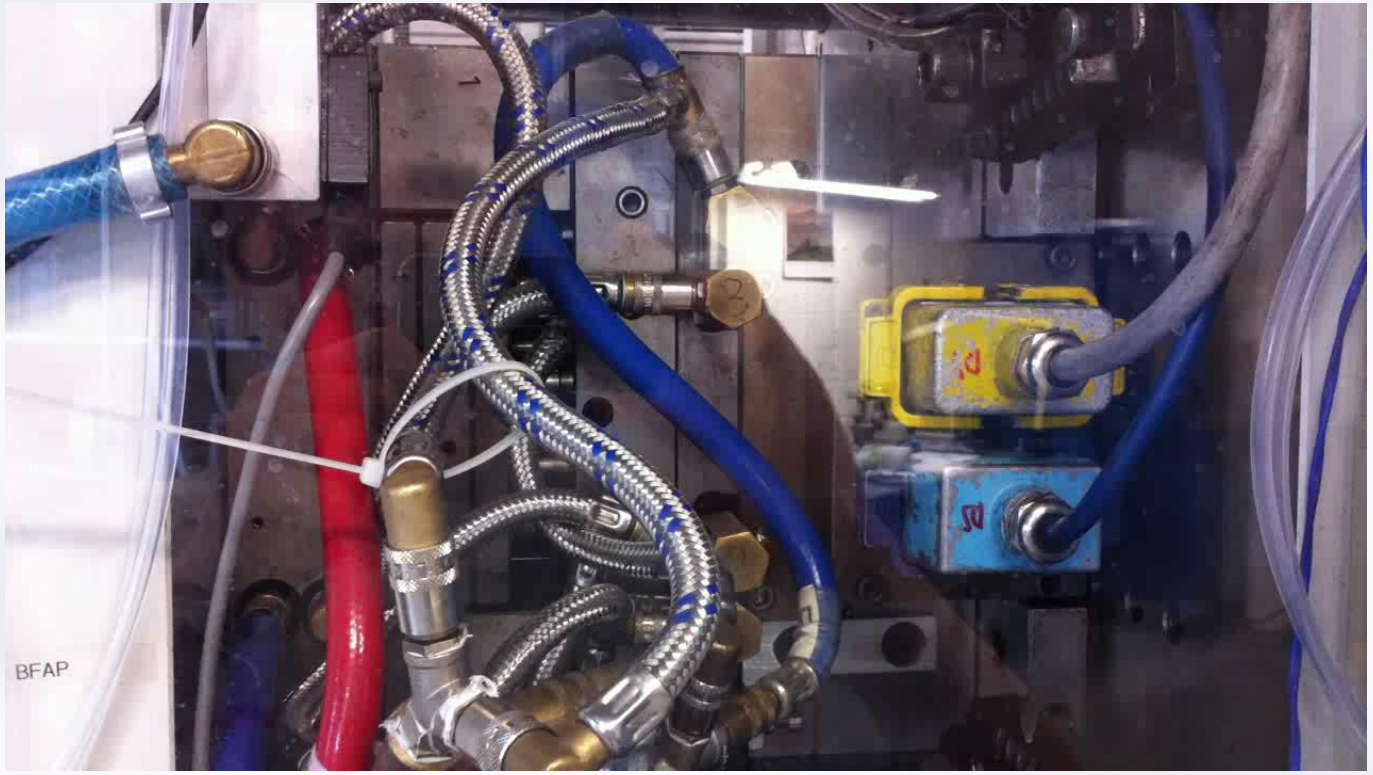
Technology over-molding

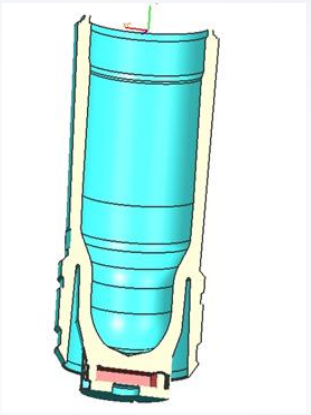
- Insert of the RFID into the mold has a central role
- Furthermore, the high temperature of the plastics during the molding process
- As well as the high injection pressure

Technology assembly

- Assembly processes are as well an option through using glue
- Or modify the current part design slightly to reach a proper fit

Injection Molding Process

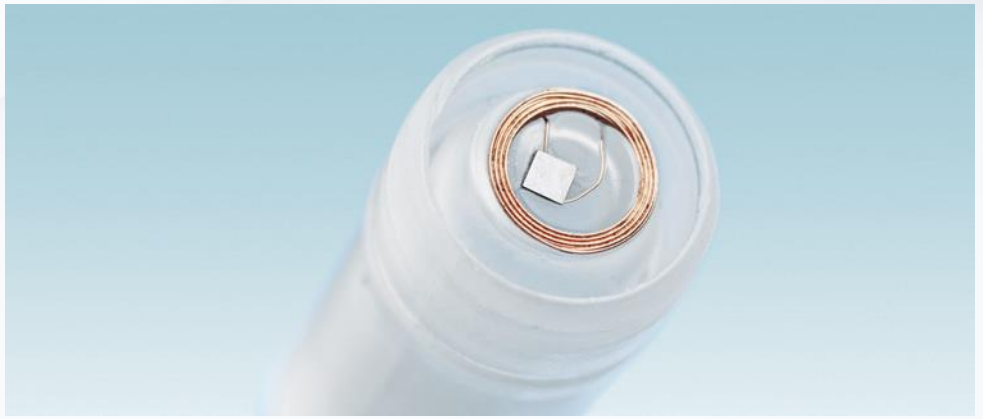




Extensive development work was necessary to avoid exposing the tags to the enormous injection pressure and the high melt temperature. The WMT melt deflection process showed the best results here.

Product Overview

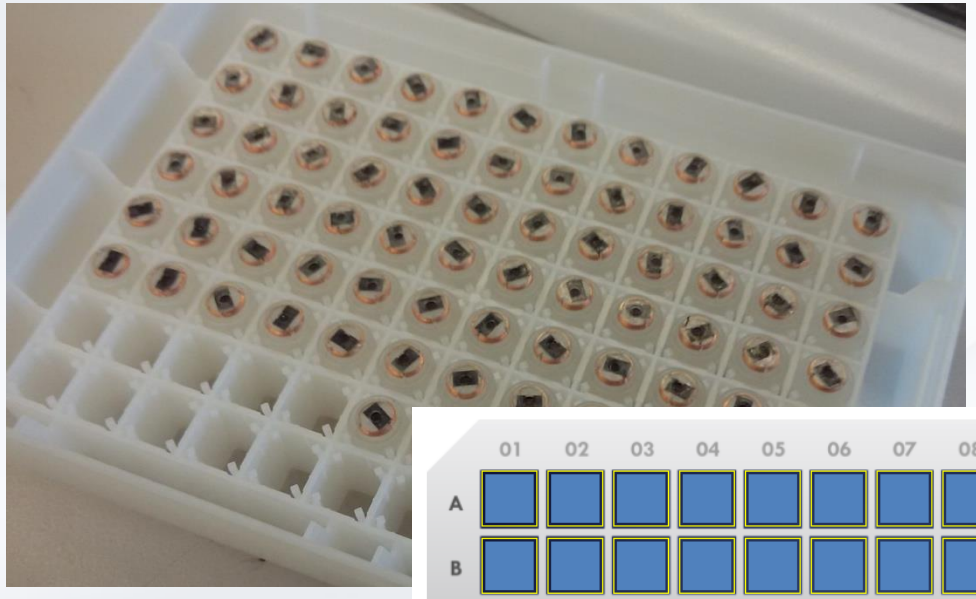
Pharma Research

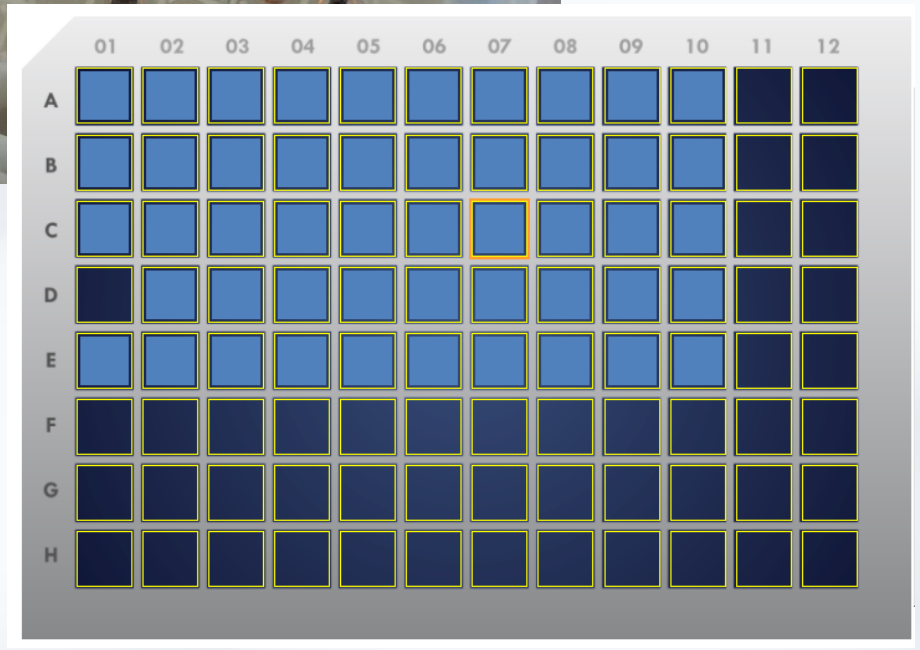


RFID Integration

- RFID product identification and tracking
- Data storage and retrieval throughout the products life cycle
- RFID partly or completely embedded in plastics
- Electronics are protected from mechanical impact

Content





Sampling & Control

Finally, it is important for the function of the system that a 100% check of the components is carried out so that the performance of the RFID transponder can be guaranteed. The failure rate is less than 4%.

Summary

- The options described represent one way of equipping consumables with storage for large-capacity information
- The strengths of this combination of plastics technology and electronics lie in the individual coding of each product and the possibility of permanent data exchange during the workflow
- It is possible to reliably identify samples such as substances in various types of containers under a wide range of conditions, as there is no optical readout.
- Automated production by inserting and over molding the transponder enables an economical manufacturing process, whereby the transponder costs can be kept within an economical price-performance ratio thanks to clear specifications

Content

Q&A Session