

**ruhlamat - WCE150**  
Laboratory System



Highest quality, proven reliability and ease of use - for a minimal investment.

**ruhlamat - WCE600**  
Semi-Automatic Production System



Very economical solution for antenna embedding and RFID inlay production.

**ruhlamat - WCE2000**  
Automatic Production System



Flexible platform for antenna embedding and RFID inlay production.

**ruhlamat - PA2000**  
eCover Production System



eCover assembly by glue application to the cover and affixing the inlay.

The **WCE150** is designed to produce RFID inlays for ID documents in the ID-1 and ID-3 format. Based on a single-station concept with manual load and unload, it is a convenient solution for laboratory usage.

The **WCE600** is a semi-automatic system designed to produce RFID inlays for ID documents (ID-1 and ID-3 format). Based on a 4-station roundtable concept with manual load and unload, this very economical solution can handle both small jobs and high-volume runs with ease.

The **WCE2000** sets the standard for high-speed wire embedding and RFID inlay production: Superior quality, highest accuracy and unmatched productivity at an unbeatable price-performance ratio. The system can be designed to perfectly match your needs: sheet to sheet (**S2S**), reel to sheet (**R2S**), or reel to reel (**R2R**).

The **PA2000** is a high speed system for eCover assembly. It is characterized by accurate glue application to the cover as well as precise alignment of inlay and cover.

**Benefits and features:**

- > Affordable system for prototyping and small production runs with up to 40 inlay sheets/hour
- > Very precise and accurate antenna embedding on various substrates

- > Automated intermetallic bonding process
- > Inlay sheet fixing on vacuum table
- > Ultrasonic wire embedding with up to 2 wire embedding heads

**Benefits and features:**

- > Very economical semi-automatic system for antenna embedding and RFID inlay production with up to 1,600 inlay sheets/hour
- > Very precise and accurate antenna embedding on various substrates

- > Automated intermetallic bonding process
- > Modular system design, with the flexibility to choose the number of heads for wire embedding, thermo-compression, and soldering

**Benefits and features:**

- > Highly modular and flexible, allows for the processing of web and sheet materials
- > Unmatched throughput up to 4,050 antennas/hour as antenna embedding machine and up to 2,000 finished RFID inlays/hour as inlay manufacturing line

- > Very precise and accurate antenna embedding on various substrates
- > Online product testing (ATS)
- > Automatic inline quality control for each process unit ensures highest quality and yield

**Benefits and features:**

- > Fully automatic manufacturing of eCover as semi-finished product for the passport booklet production of electronic passports
- > High precise alignment of inlay and cover

- > Automatic feeder and stacker system for long autonomous machine operation
- > PUR hot melt or casein glue application
- > For 2up or 3up formats

**ruhlamat - WCE series**  
Fast and precise antenna laying systems

**ruhlamat** MACK GROUP  
solutions for your needs.

Any antenna geometry is possible, including meander

Powerful design software "Easy Create"



Easy import of CAD data

Patented ruhlamat wire embedding heads

Especially designed for the production of high quality Coil on Module (CoM) antennas with constant frequencies and almost zero pitches (depending on substrate).

## High-quality RFID inlays - quickly and economically

Our reliable machine solutions offer great flexibility and productivity, enabling you to make both prototypes and mass products in an economical way and with consistently high quality. From antenna embedding to production of complete RFID inlays and eCovers, the options are versatile.

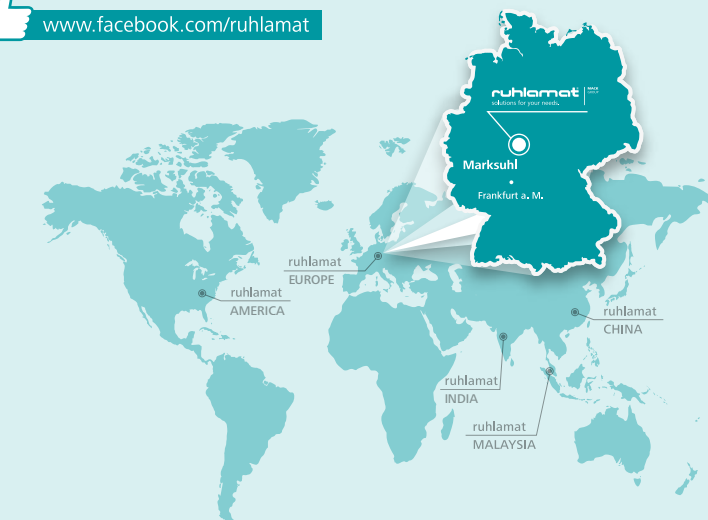
Wire embedded antennas produced on ruhlamat machines are extremely cheap and yet provide the best product characteristics compared to etched or plated antennas.

Our excellent sonotrode know-how for various substrate / wire combinations ensures highest precision at wire embedding. Optimised sonotrode geometries and materials guarantee best performing products with proven reliability even in the most demanding applications.

ruhlamat – customised machine solutions for

- > Chip Module Production
- > RFID Inlay Production
- > Card Production
- > Card Personalisation
- > Card Quality Control
- > Passport Personalisation
- > Passport Quality Control
- > Special Machinery

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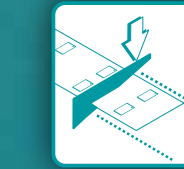
## RFID Inlay Production



### Handling



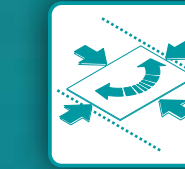
WEB INPUT AND TRANSPORT - LARGE FORMAT



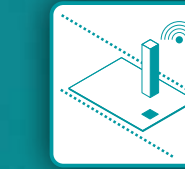
SHEET CUTTING - GUILLOTINE



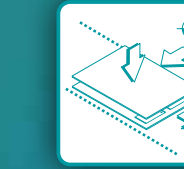
SHEET FEEDER - STACK / CONTINUOUS



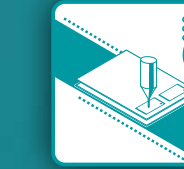
SHEET ALIGNMENT



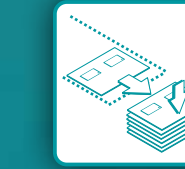
HOLE/HINGE PUNCHING - MECHANICAL / ULTRASONIC



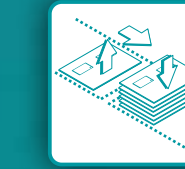
SHEET PICK AND PLACE - HIGH PRECISION



SPOT WELDING - HOT SPOT/ULTRASONIC

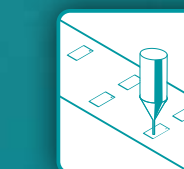


INLAY - STACKER BOX

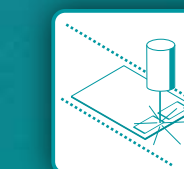


PILE OUTPUT CONVEYOR

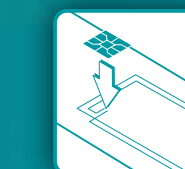
### Process



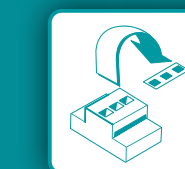
WIRE EMBEDDING - 2/4 / 8 HEADS



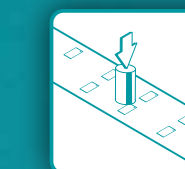
VANISH REMOVAL - ANTENNA WIRE



MODULE IMPLANTING



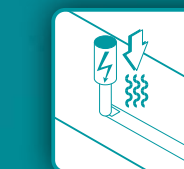
MODULE FLIPPING



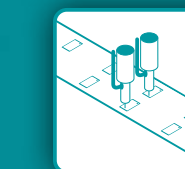
MODULE HOT PRE FIXING



MODULE GLUING



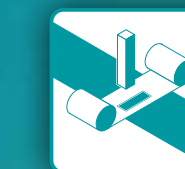
WELDING - 2 HEADS



SOLDERING - 2 HEADS

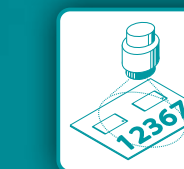


DOD PRINTING - MONOCHROME

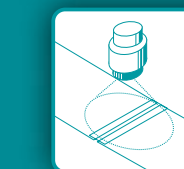


INLAY LABELLING - MODULE (ANTI-CRACK)

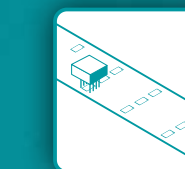
### Testing / Measurement



OPTICAL VERIFICATION / MEASUREMENT



SPlicing DETECTION



MODULE PRE TESTING



RFID TESTING - 2 HEADS / 4 HEADS / 24 HEADS