

# Dual Interface Cards & Technologies



# COMPANY



- Owner-managed group
- International market leadership in the fields of
  - Parts & Systems
  - Semiconductor Related Products
  - Document Solution Related Products
  - TECURITY® Solutions
- The Mühlbauer Group's philosophy: Our customers are our partners!





## BASIS

- 3,500 employees at 35 sites worldwide
- 400 engineers in R&D
- 400 trainees
- Excellent sustainability standards



## BASIS

- Annual investments (approx. 15 million EUR) in
  - Latest technologies
  - Infrastructure
  - Systematical & logical completion of the product chain

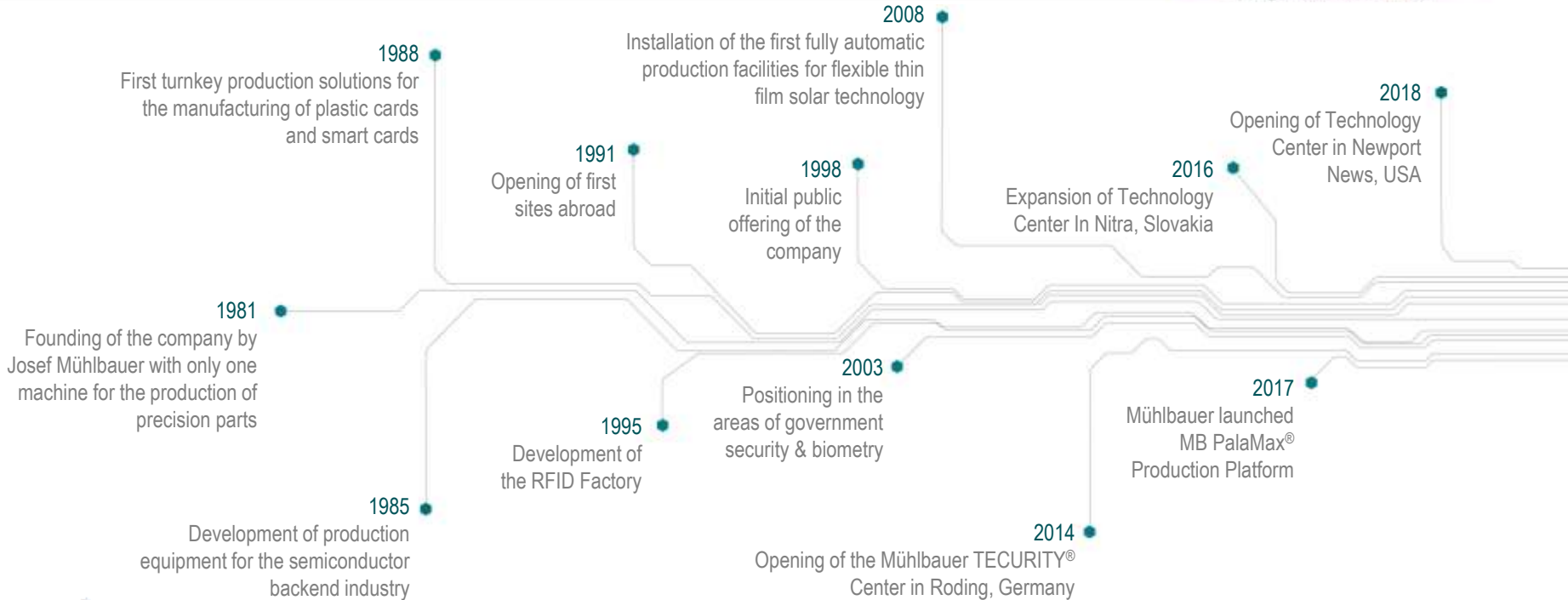


## MARKET POSITION

- PARTS & SYSTEMS – parts manufacturing across all sectors
- AUTOMATION – market leader in the areas of RFID
- TECURITY® – solution partner for identification & verification projects



# History





- 35 production & service locations
- Technology centers in the USA, Slovakia, Serbia, Malaysia & China
- Inhouse precision-part production
- Provision of
  - High-end semiconductor & RFID systems
  - Reliable vision inspection technologies
  - Innovative ID document end-to-end-solutions
  - Secure access & border control systems





## PARTS & SYSTEMS

Precision Parts  
for Aerospace, Automotive,  
Semiconductor & Engineering



## AUTOMATION

Machines & Solutions  
for SRP & DSRP



## TECURITY®

Solutions  
for Governments



## SEMICONDUCTORS

Intelligence for  
Security & Communication



## RFID

Smart Label Technology for  
TECURITY® & IOT



## FLEXIBLE SOLAR

Efficient Solution for Clean  
Energy Everywhere



## LED

Energy-Saving Light  
for the Future





# Security & Quality Certificates

## SECURITY PRINTER

## SECURITY SUPPLIER

## IT SECURITY ISO IEC 27001

## QM SYSTEM ISO 9001:2015



# Associations & Initiatives

## MEMBERSHIP IN GOVERNMENTAL INITIATIVES, WORKING GROUPS & COMMITTEES

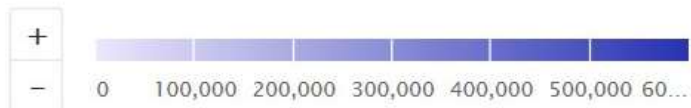
- German-African Business Association
- Ghorfa Arab-German Chamber of Commerce and Industry e.V.
- IATA Strategic Partner
- INTERPOL Project S-Print
- Operation Genesis  
U.S. Department of Homeland Security





# Mobile Payment Market





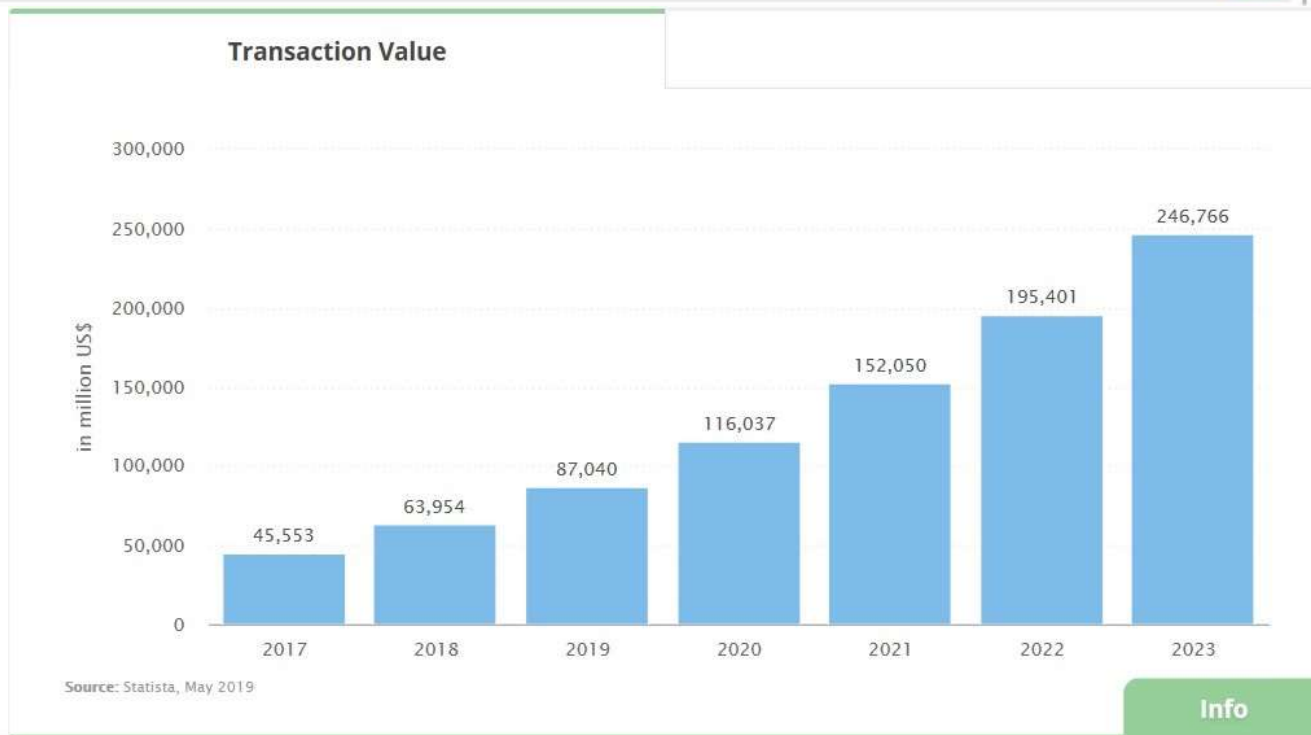
Source: Statista, May 2019 © Natural Earth

Top 5	
 China	US\$581,372m
 United States	US\$87,040m
 United Kingdom	US\$10,949m
 Brazil	US\$6,297m
 India	US\$5,975m

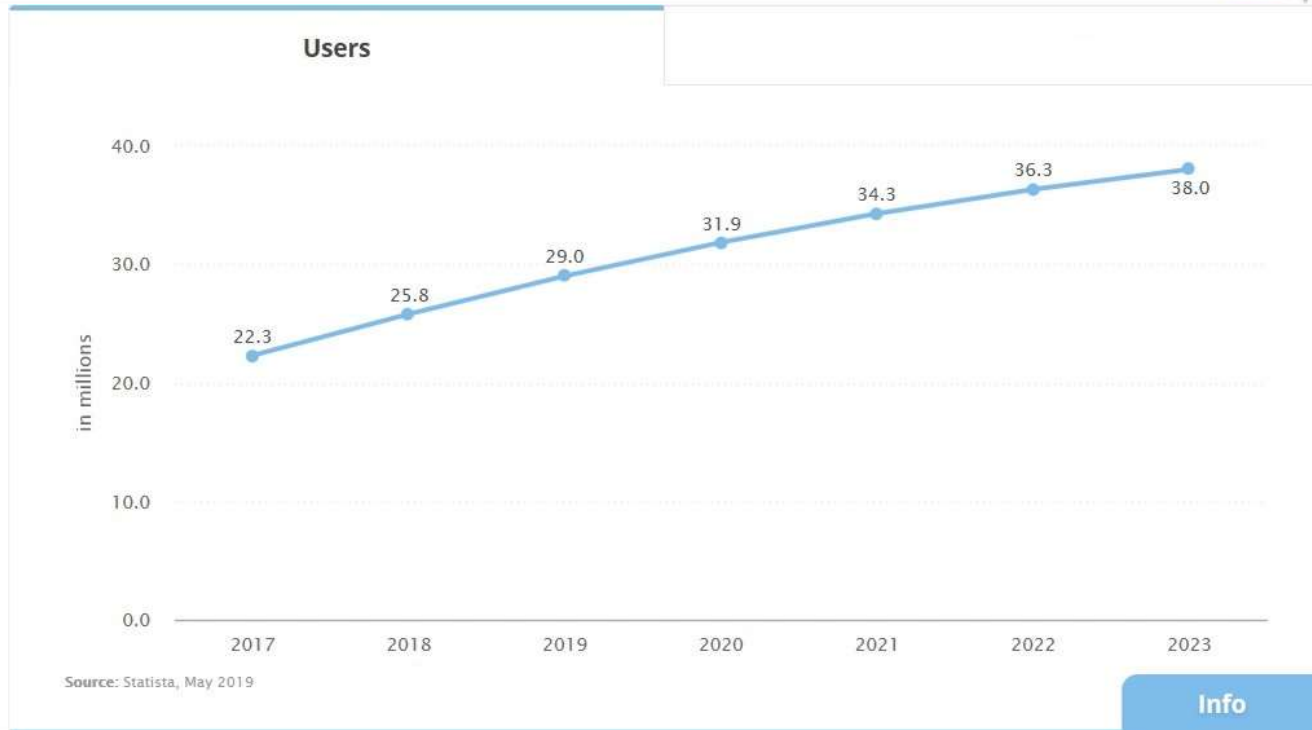
Info



# Mobile POS Transaction Value in the US

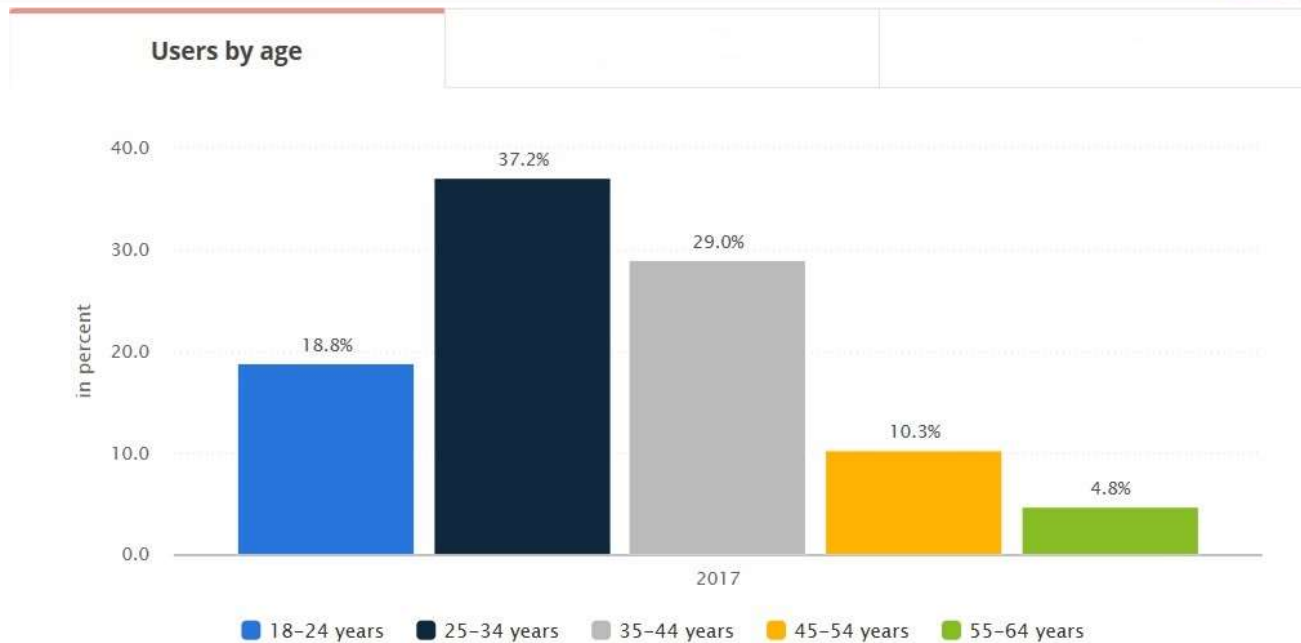


# Mobile POS Transaction Users in the US





# US Mobile POS Transaction Users by age

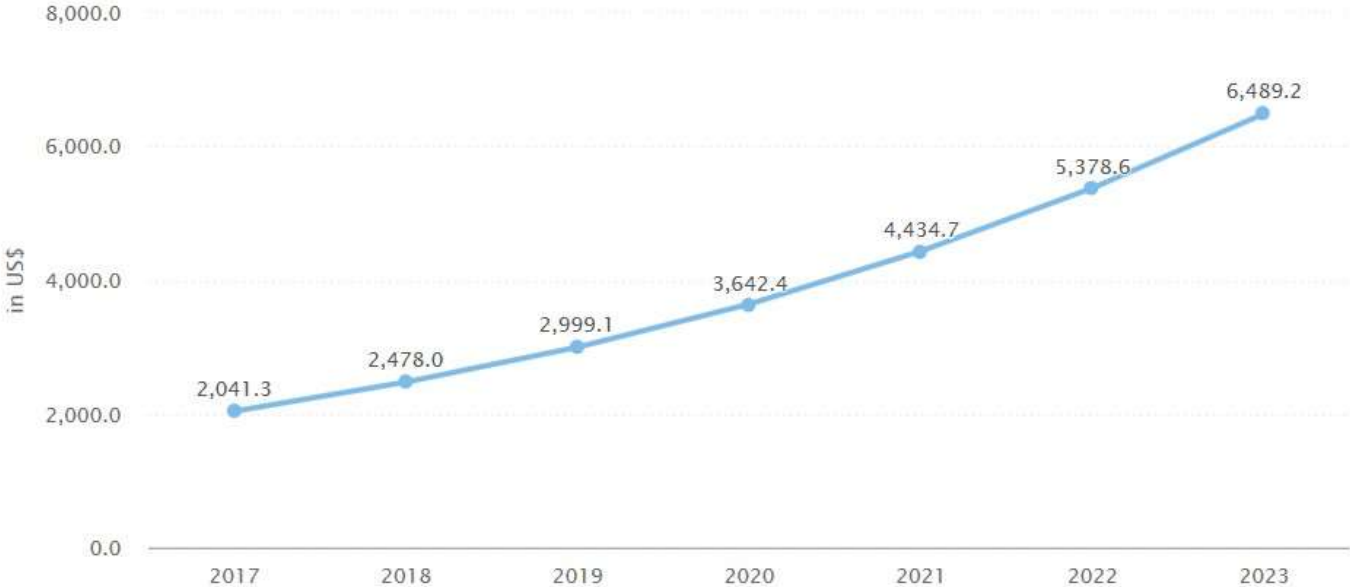


Source: Statista Global Consumer Survey, July 2018

Info



# Average Transaction Value per User



Source: Statista, May 2019

Info


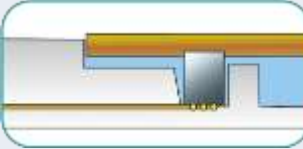
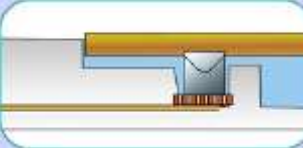
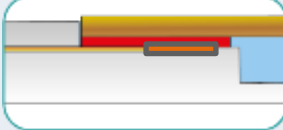


In particular **MB TeConnect**

Dual Interface Technologies



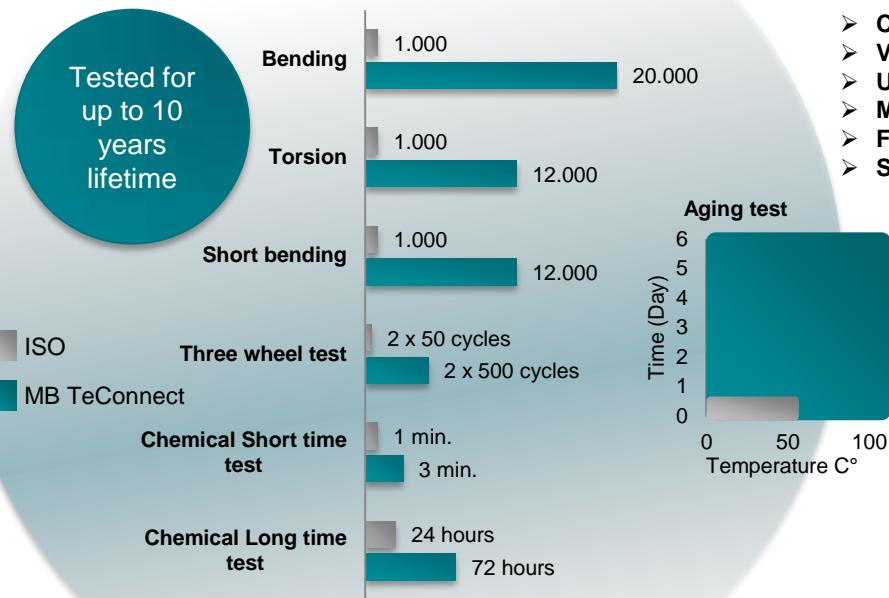
# Dual Interface Technologies / Overview

<h2>Electromagnetic Coupling</h2>	<p>Electromagnetic coupling of the chip and the antenna</p>		<ul style="list-style-type: none"> <li>+ Low invest for integration in existing production</li> <li>- Non-destructive manipulation Chip/Card possible</li> <li>- Expensive consumables (Chip &amp; Inlay)</li> <li>- Dependency on specific antenna and chip module supplier</li> <li>- Not capable for high power connections (BC or SoC)</li> <li>- Card body and chip module need to be fine tuned</li> </ul>
<h2>MB-TeConnect</h2>	<p>Advanced Solder Technology</p>		<ul style="list-style-type: none"> <li>+ Solid and reliable physical connection</li> <li>+ Certified for 10 years on PC</li> <li>+ Ready for Pre- Personalization right away</li> <li>+ Simple wire antenna with meander</li> <li>+ Ideal Technology for Biometric or System on Card</li> </ul>
<h2>Other Solder Technologies</h2>	<p>Require additional metal pad and partially additional Pre-Solder on Device</p>		<ul style="list-style-type: none"> <li>+ Low invest for integration in existing production</li> <li>+ Ready for Pre- Personalization right away</li> <li>- High cost due to additional tin or copper pad/Pre-Solder</li> <li>- Increased failure risk due add. interconnection wire &amp; pad</li> <li>- Metal pads in card create deformation through processing</li> </ul>
<h2>Anisotropic Conductive Film</h2>	<p>Conductive HAF</p>		<ul style="list-style-type: none"> <li>+ Low invest for integration in existing production</li> <li>- High consumable cost</li> <li>- Not working on standard wire antenna, metal pad required</li> <li>- High failure rate in performance test (HAF takes humidity)</li> <li>- Danger of warpage of card (unsymmetrical card structure)</li> </ul>



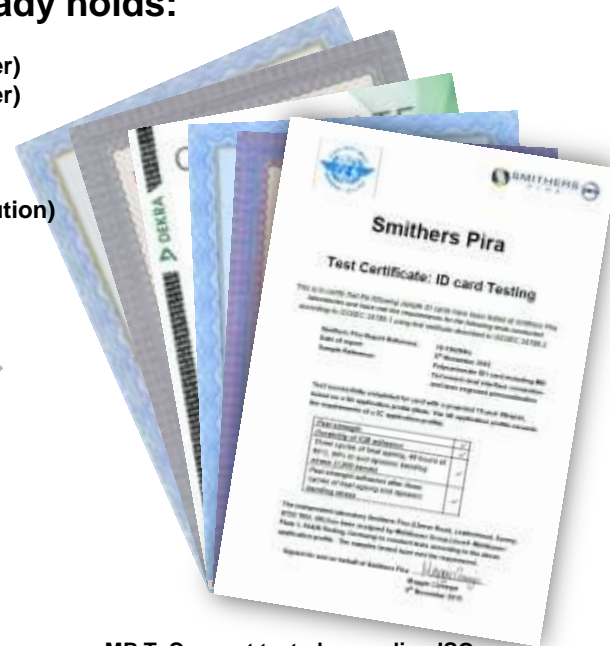
# MB TeConnect Technology → Highest Quality Level

## MB TC versus ISO Requirements



## MB TeConnect already holds:

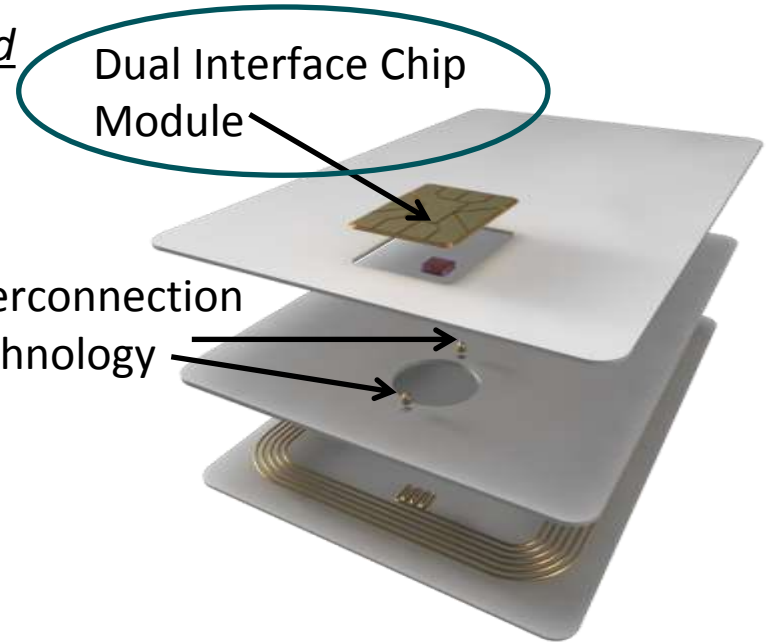
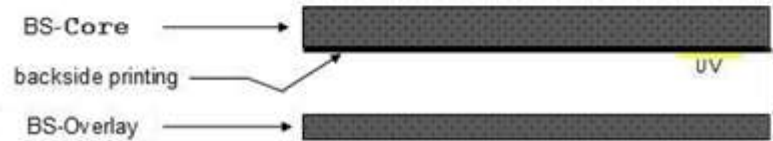
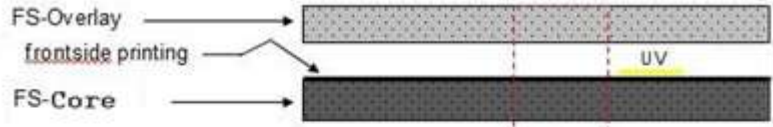
- CQM® Certificate (by customer)
- VISA® Certificate (by customer)
- Union Pay® (by customer)
- MIR® (by customer)
- FOGRA (external Institution)
- Smithers Pira (external Institution)



MB TeConnect tested according ISO 24789 hardest lifetime tests

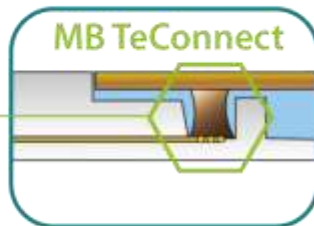
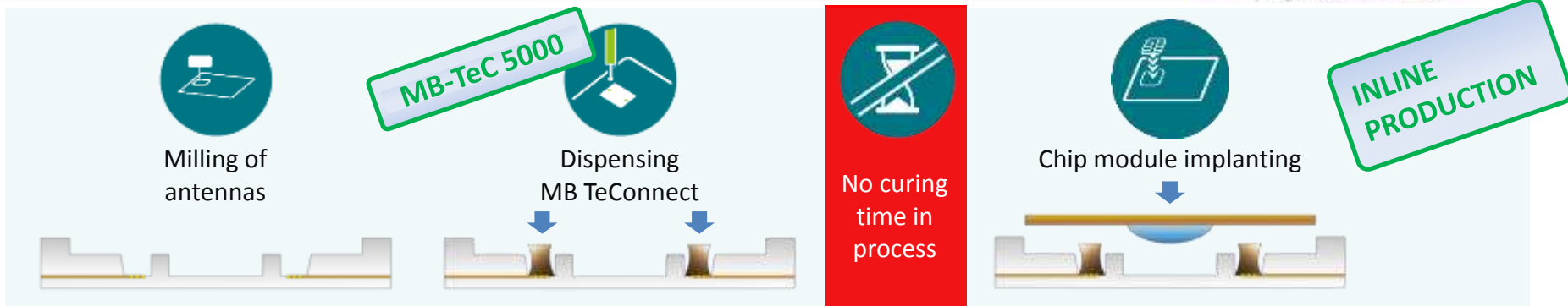


## Card Body Structure for a TeConnect Payment Card





# MB TeConnect simple 3 STEP Production



## FACTS & FIGURES

- Real "INLINE" process enabling Pre-personalization as option
- Strongest Physical connection between antenna and chip
- Proven durability and reliability from external laboratories
- Inline Dual Interface production workflow
- MB-TeC 5000 paste is shipped as **non hazardous substance**

## Feel free...

- ...to use what ever (Dual Interface) chip module you want.
- ...to use different antenna types; Recommended embedded copper wire antenna, but also etched antenna or wire with metal plates is possible.
- ...to use the inlay substrate material you want: PVC, PC, ABS., etc...
- ...to use your own antenna design.
- ...to use a proven 2<sup>nd</sup> generation Technology with best cost per Card Ratio for highly competitive business



## Reject costs per year

(13m cards/year, 0,80€ per card)



**Cost of ownership per card: 0,018 €**



# MB TeConnect Cost advantage versus electromagnetic Coupling

MB TeConnect	Additional Consumbale Cost	Inductive Coupling
✓	Antenna Inlay	+ 0,04€/card
✓	Module	+ 0,05€/card
+0,006€/card	Paste	✓
+0,005€/card	Milling Tool Antenna Touch	✓
✓	Bonding/glue coating	+0,01€/card
+0,011€/card	<b>Total</b>	<b>+0,10€/card</b>
<b>- 0,089€/card</b>	<b>Advantage MB</b>	<b>+0,089€/card</b>

Yearly production	Cost saving
4.500.000 cards	400.500€
10.000.000 cards	890.000€
13.000.000 cards	1.157.000€
50.000.000 cards	4.450.000€
100.000.000 cards	8.900.000 €



Max. Output of 1 DICL5000 machine per year running 3 shifts



Potential for Future

# Biometric Card & System on Card

MB TeConnect







# MB TeConnect Worldwide References



- Algeria
- Australia
- Brazil
- China
- Egypt

- Germany
- India
- Indonesia
- Japan

- Malaysia
- Nigeria
- Philippines
- Russia

- Saudi Arabia
- South Korea
- Spain
- Ukraine
- USA



IC Korea



- Confidence of governments & public authorities worldwide
- Trust and reliability - our most important values
- Convincing by high speed, best quality & strict customer orientation
- Planning, risk management, effective monitoring & support
- Close partnerships with all stakeholders

**YOUR TRUST IS OUR GREATEST MOTIVATION TO  
TURN EVERY CHALLENGE INTO A SUCCESS STORY.**



MÜHLBAUER GmbH & Co. KG  
Josef-Mühlbauer-Platz 1  
93426 Roding  
GERMANY

Phone: +49 9461 952 0  
Fax: +49 9461 952 1101  
Mail: [info@muehlbauer.de](mailto:info@muehlbauer.de)  
Web: [www.muehlbauer.de](http://www.muehlbauer.de)

