

Wir fügen anders ...

We join differently...

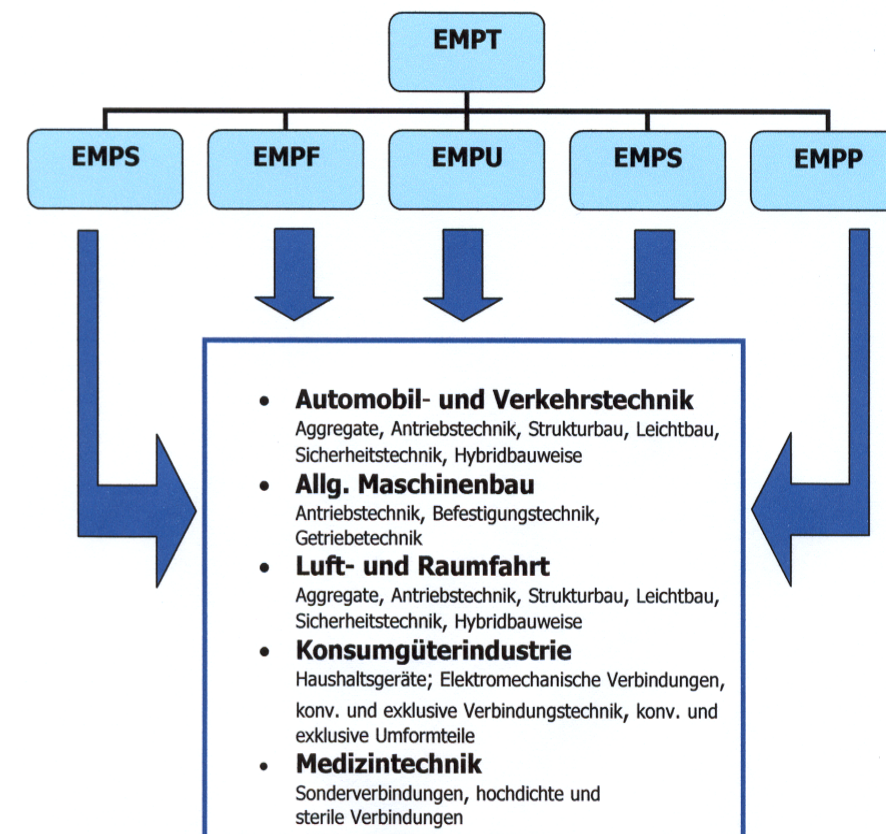
**Electromagnetic pulse technology (EMPT).
Keys for allocating the industrial market segment**

R. Schäfer, P. Pasquale



Products and services

- ⊙ **Product and specific tool development** with the target of **substitution** of your joining, welding or forming processes with the EMPT
- ⊙ **Engineering, numerical simulation and development** of solutions for the usage of EMPT with the focus of **cost reduction** and **technical optimisation** of your product
- ⊙ **FEM Analysis (Process, Tools and Applications in service)**
- ⊙ **Conception, development and production** of specific **lightweight** and **hybrid** structures
- ⊙ **Compilation of „ready to manufacture“ systems** with **technical service**
- ⊙ **Realisation of prototypes and mass production** of your products in our plant





EMPT systems

examples:

- high speed EMPT systems
- Special coils
- EMPT multiple coil technique
- Pharma packaging systems
- ...

Engineering and Prototyping

examples:

- Cockpit carriers
- Drive shafts
- Crash management (crash boxes)
- EMPT filter housings
-



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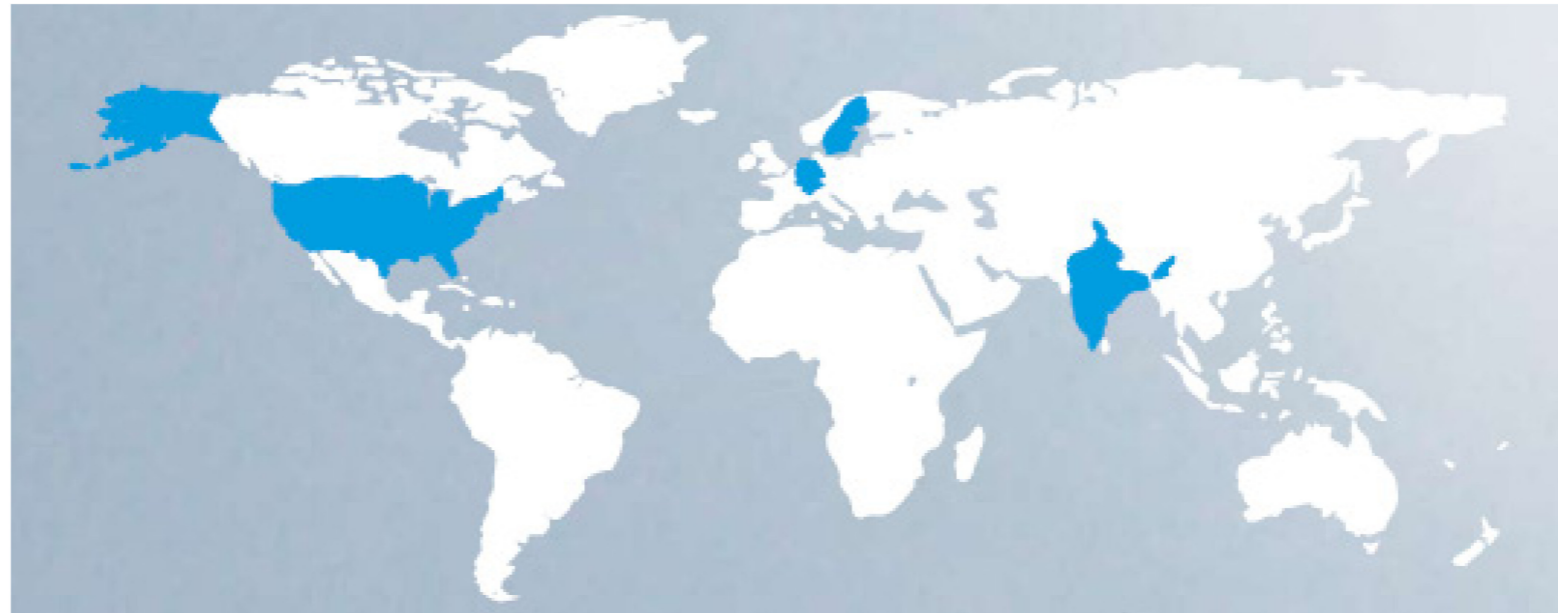
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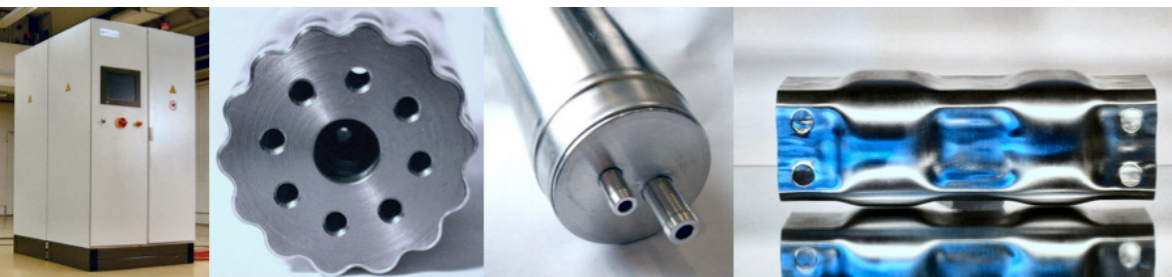
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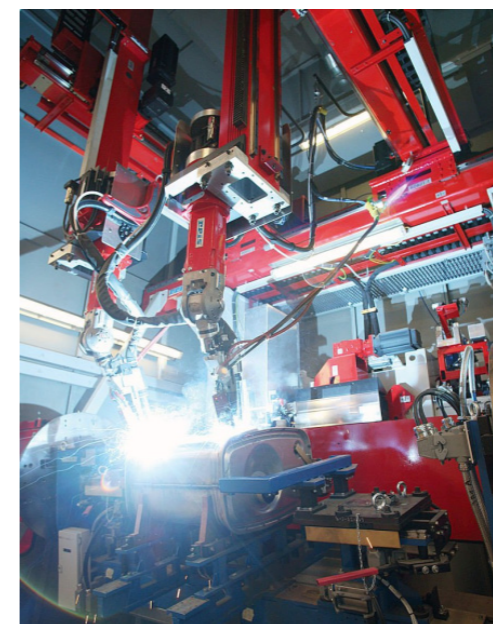
T: +91 44 2445 0715 or 16
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Competitive processes



Competitive processes



Source: Reis Robotics

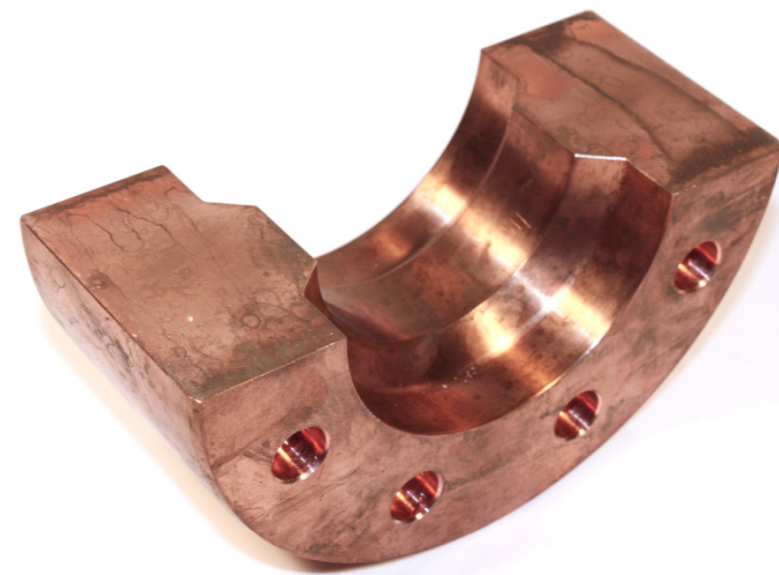
- ✓ No auxiliary materials (gases/filler wire)
- ✓ Robust process
- ✓ No sophisticated quality insurance
- ✓ Fast process
- ✓ No heat affected zones
- ✓ Easy to control
- ✓ PST offers Pay per Pulse option

○ Mid to High investments

- ✓ Low to high investment
(manual welding-automated welding)
- Need for gases/filler wire
- demanding process
- sophisticated quality insurance
- Slow process
- heat affected zones



Competitive processes



- ✓ No auxiliary materials (gases/filler wire)
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○ Mid to High investment



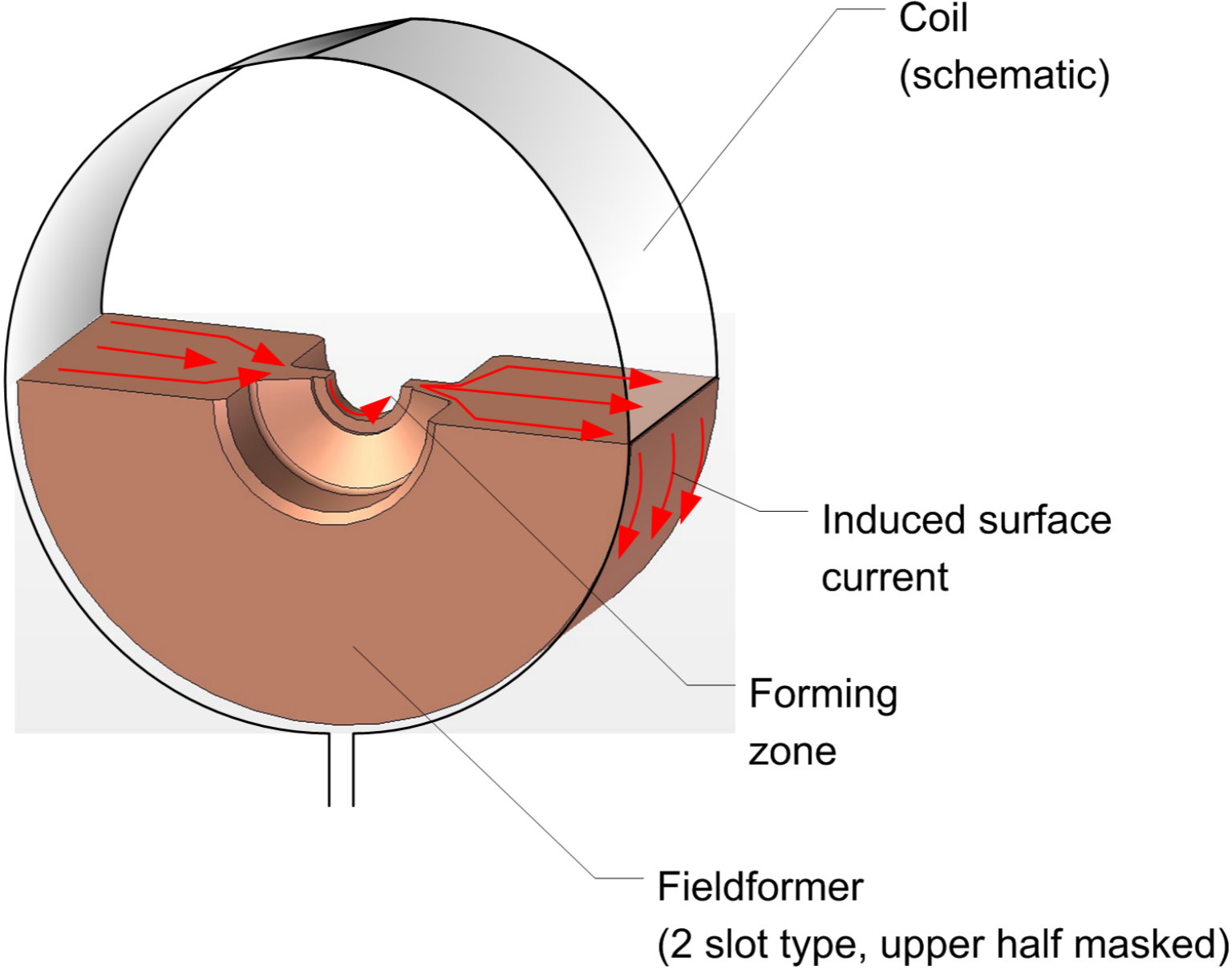
- ? Flexibility
- ? Coil life time
- ? Capacitor life time
- ? Switch life time
- ? Production rate

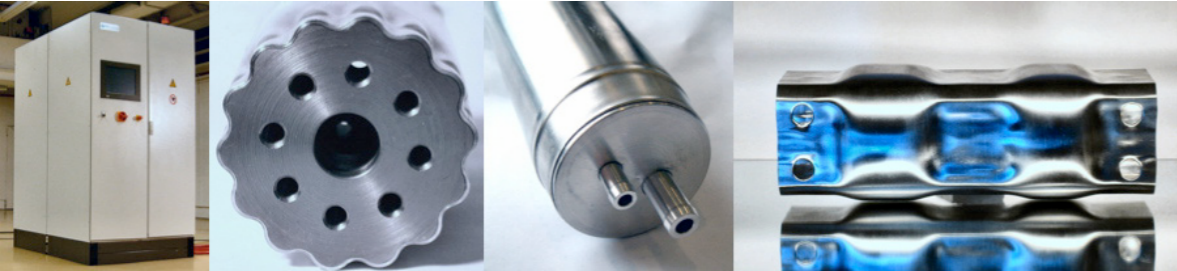
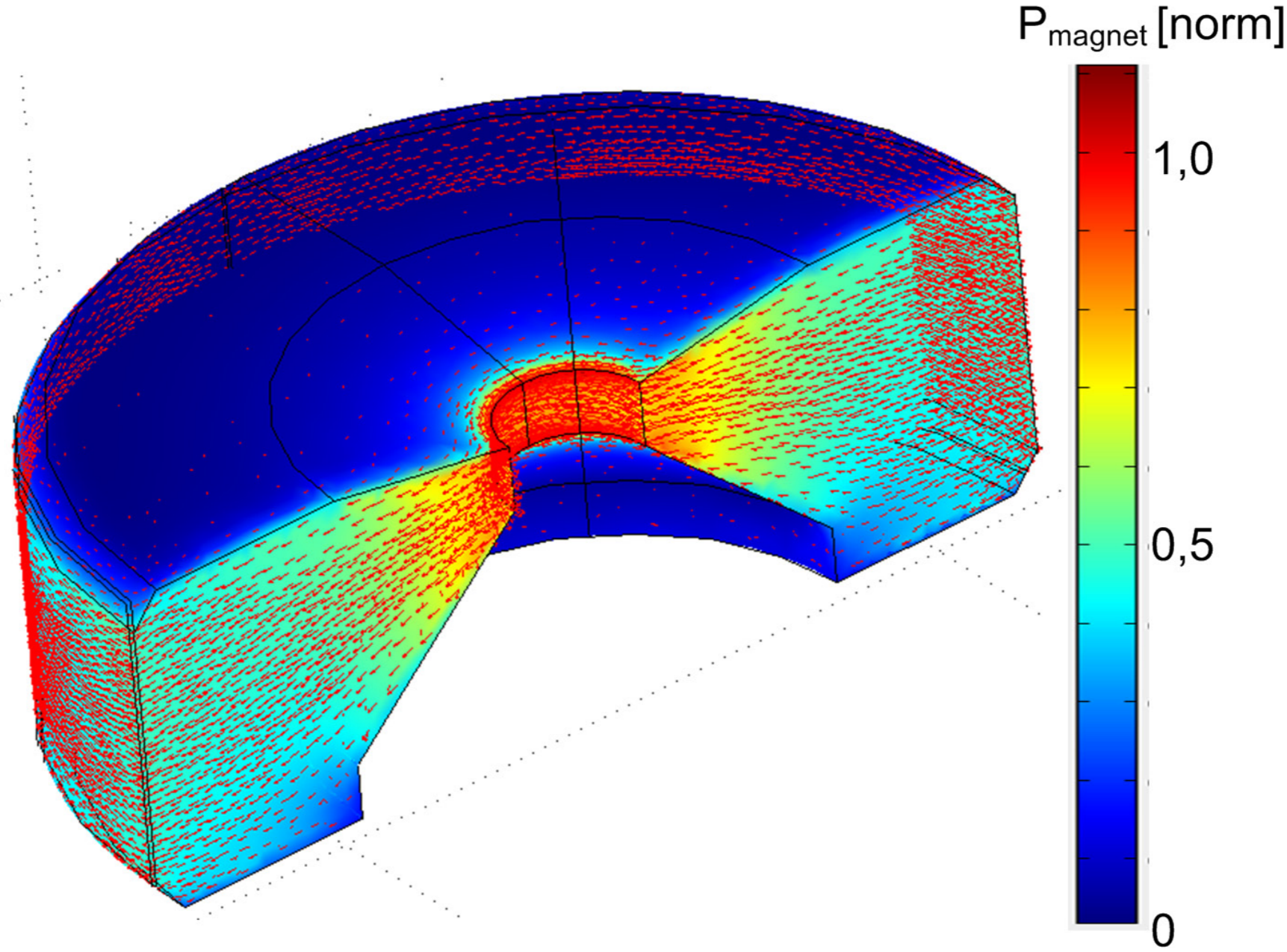


Field shaper



Field shaper





Competitive processes



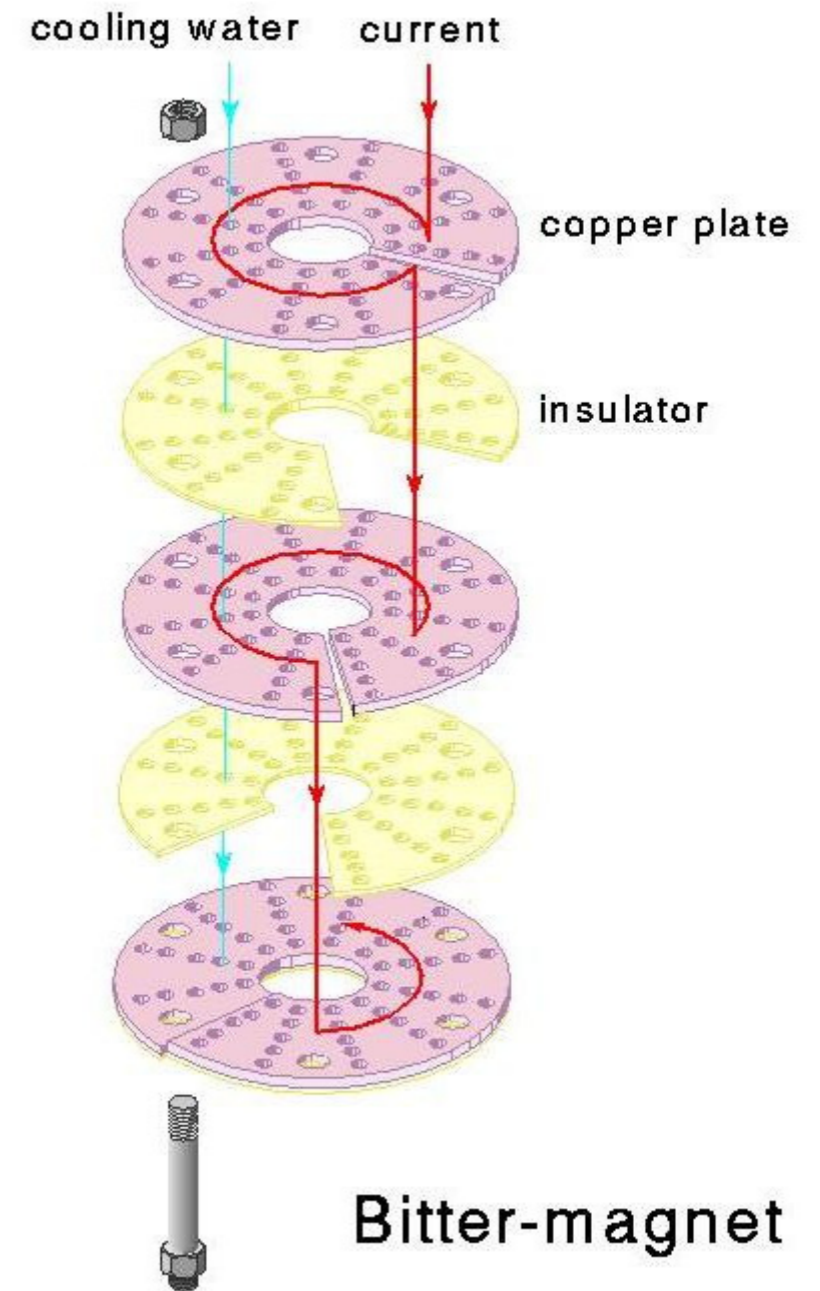
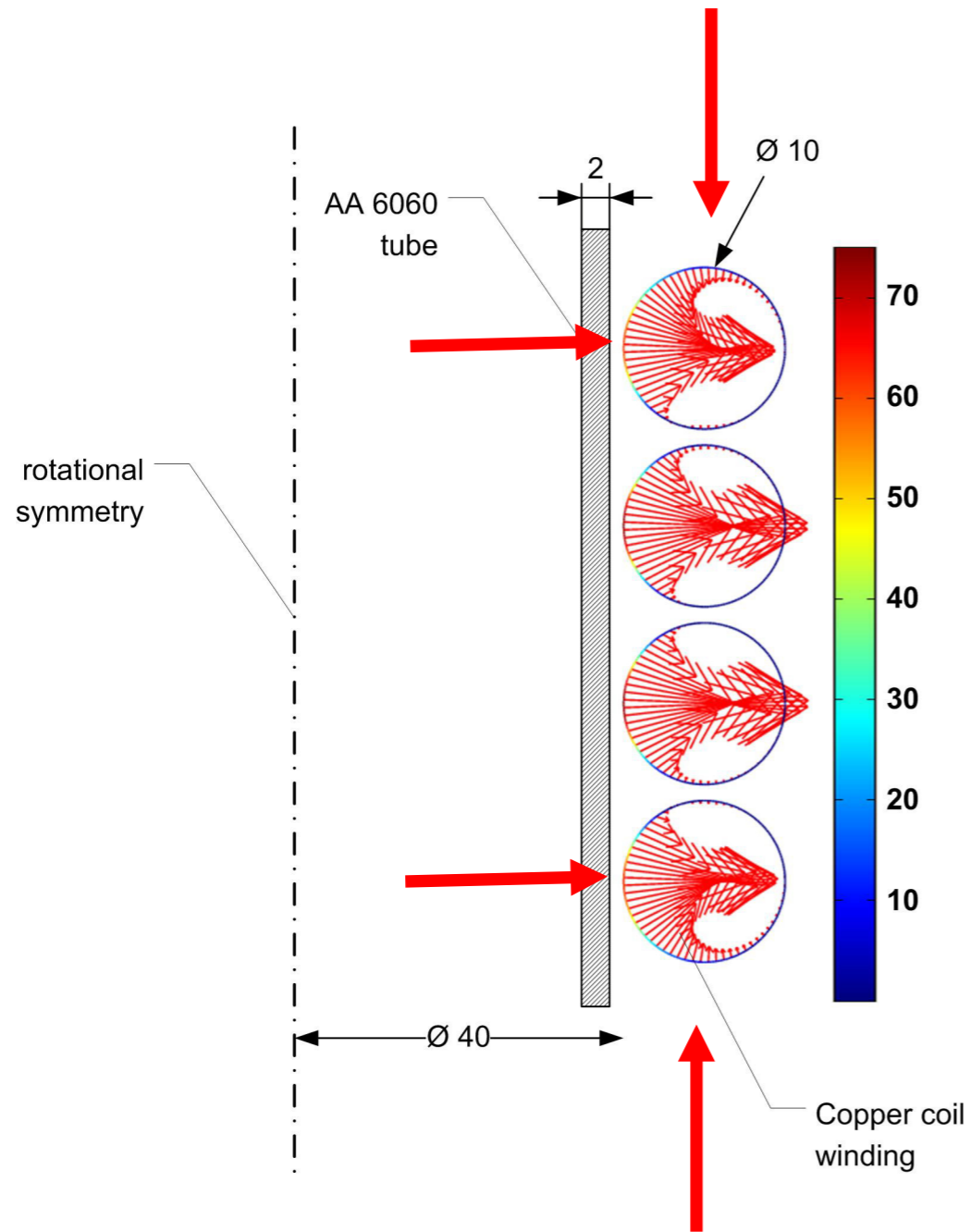
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○ High investment

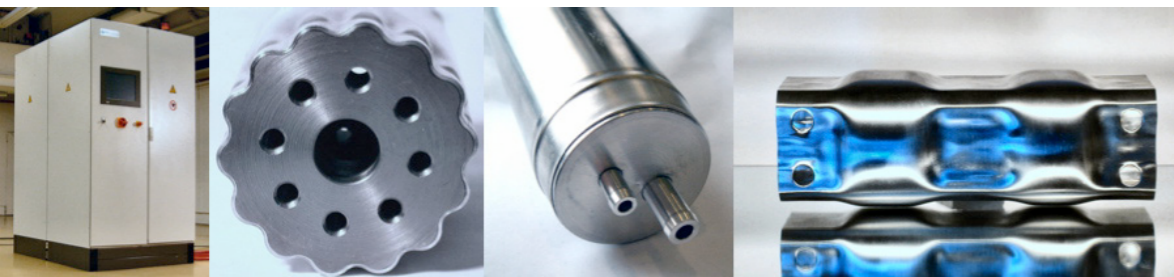


- ? Flexibility
 - ? Coil life time
 - ? Capacitor life time
 - ? Switch life time
 - ? Production rate
- Self reinforcing coils





Source: Radboud University Nijmegen



PSTproducts EMPT coils

Compression coils

Single winding, 2,3 and more windings

Life time 2.000.000 pulses



Multiple joining coils

Single & multi winding

Life time: up to 2.000.000 pulses



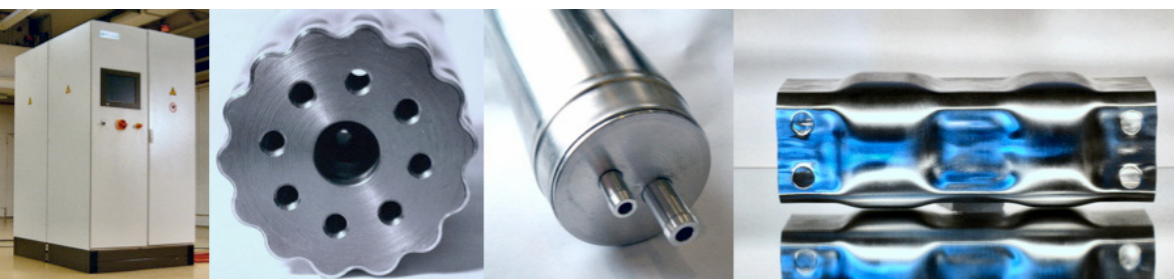
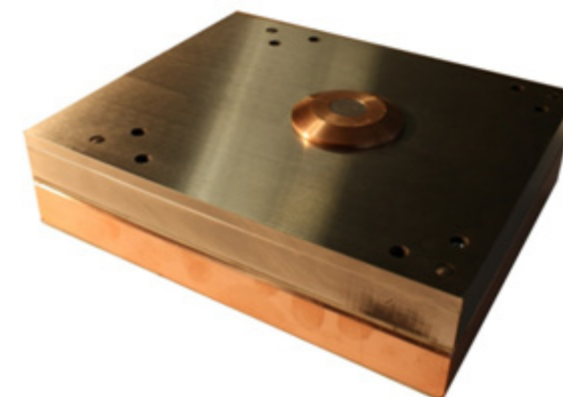
Expansion coils

High efficiency, high life time



Special coils

Cutting, forming, welding...



EMPT Systems PSxx BlueWave Series



PSTproducts PSxx Series

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January 2010

Characteristics	PS8-16/25 to PS32-16/25	PS48-16/25 to PS96-16/25	PS112-16/25 to PS160-16/25
switchable banks	up to two	up to six	up to ten
normal rated discharge energy	8kJ to 32kJ	48kJ to 96kJ	112kJ to 160kJ
charging voltage	16kV or 25kV	16kV or 25kV	16kV or 25kV
normal rated discharge current (repetitive)	up to 320kA	up to 960kA	up to 1600kA
max peak current	up to 480kA	up to 1440kA	up to 2400kA
short cut current (non repetitive)	up to 800kA	up to 2400kA	up to 4000kA
pulses per minute	up to 12	up to 12	up to 12
cable length (standard)	5m	5m	5m
switching technology	mercury free, long life industrial switches	mercury free, long life industrial switches	mercury free, long life industrial switches
number of pulses with one switch set	up to 400 000	up to 400 000	up to 400 000
process control	LAN and/or VPN	LAN and/or VPN	LAN and/or VPN
life time capacitor	2 to 2,5 millions	2 to 2,5 millions	2 to 2,5 millions
number of joints per pulse	depends on coil concept : 1 to 20 joints	depends on coil concept : 1 to 20 joints	depends on coil concept : 1 to 20 joints
dimensions (without tooling space)	800 x 1200 mm	1600 x 1200 mm	1600 x 2400 mm
price	on demand	on demand	on demand



Competitive processes



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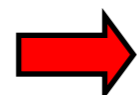


- ? Flexibility
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- ? Production rate



Multiple joining coil (Mjo)

○ Mid to High investment per part



significant reduction of processing cost

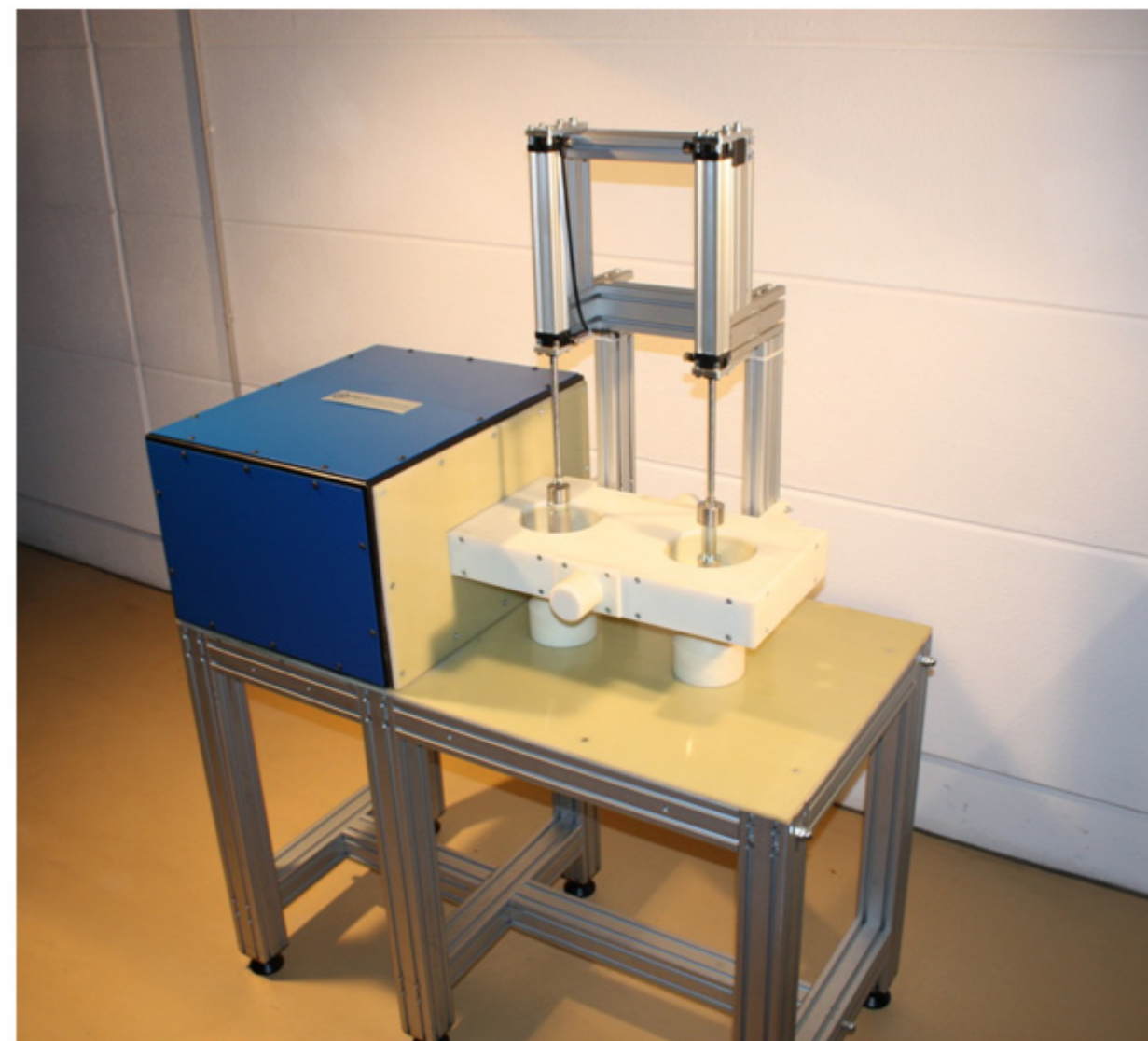


Special coils (patent pending)

Multiple Joining Coil (MJo Coil)

Features:

- multiple joining and forming of up to 600 workpieces per minute
- Bespoke development for mass production in the automotive, pharma and packaging industry sectors



EMPT Systems PSxx Series



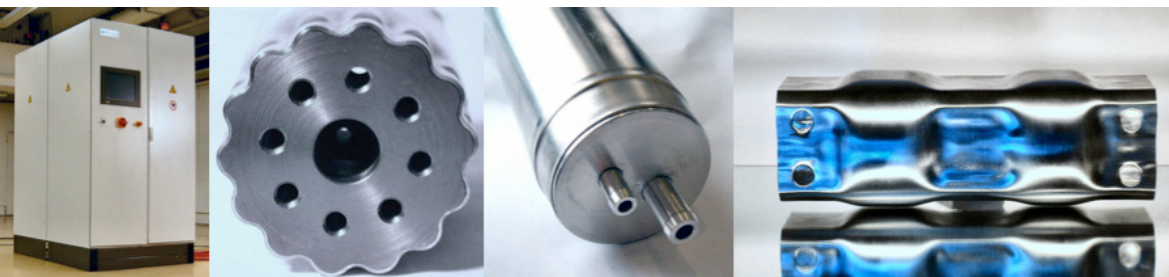
Customer:  **BOSCH**

Product:

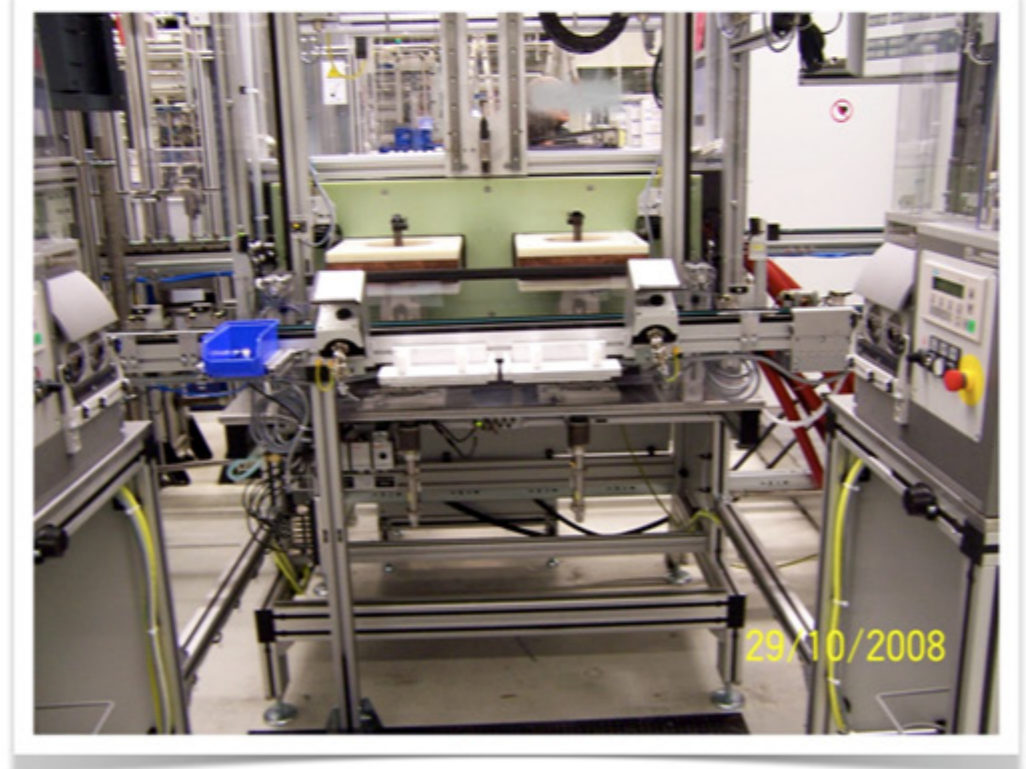
Injection pipes
for common rail diesel engines



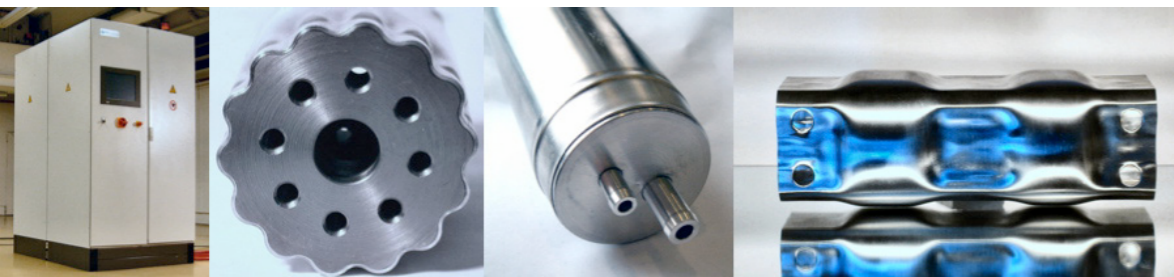
Units per year: 2.000.000



EMPT Systems PSxx Series



EMPT automotive aggregates



Electromagnetic Pulse Crimping



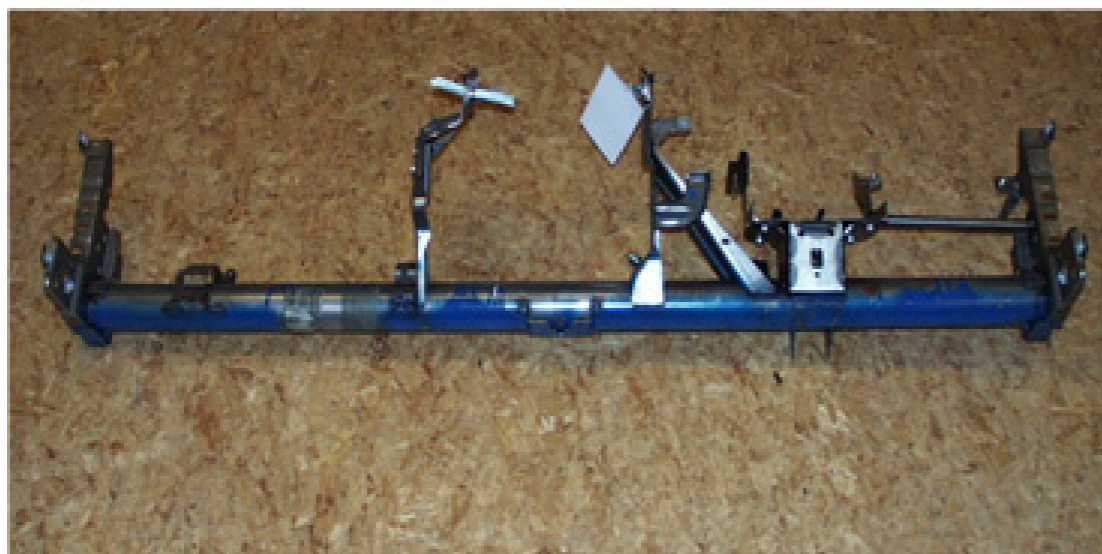
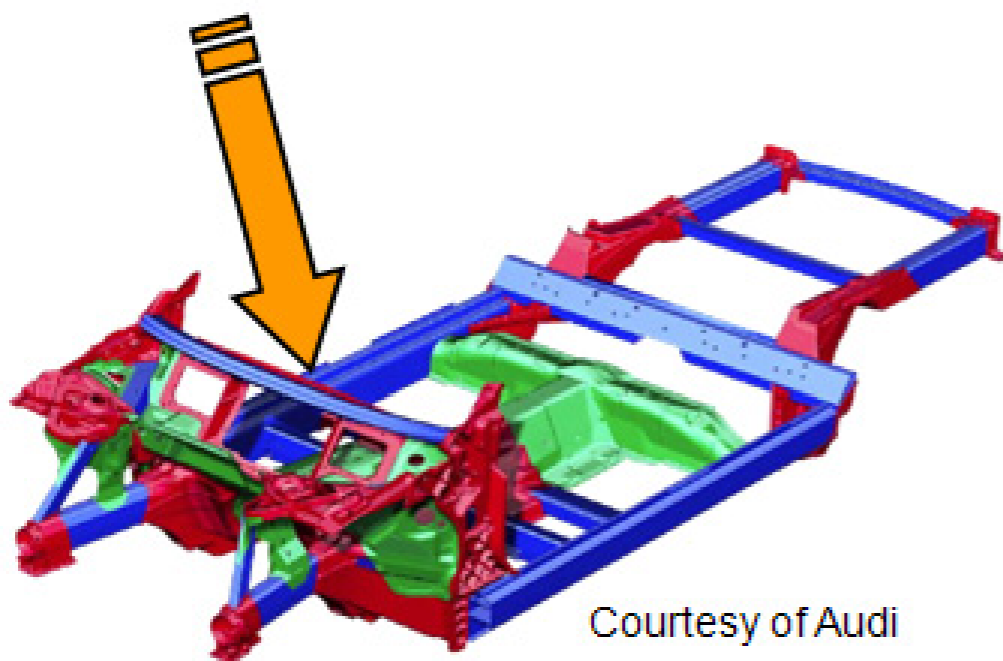
Steel to steel
St52
WT 2,5mm
Diameter 35mm



PST Variante
Energie: 16 kJ
1
Material (Al - AlMgSi1)
WS: 1,5 mm
TR, SG, MoS2

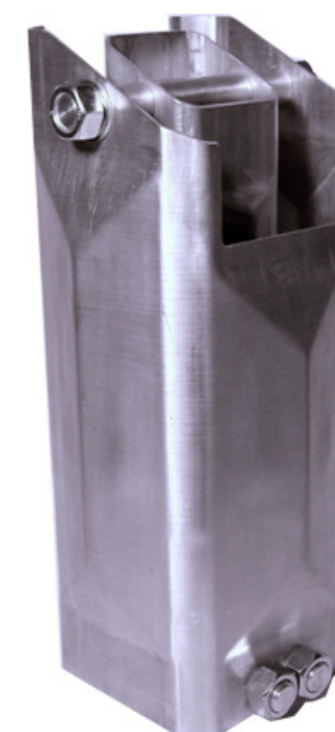
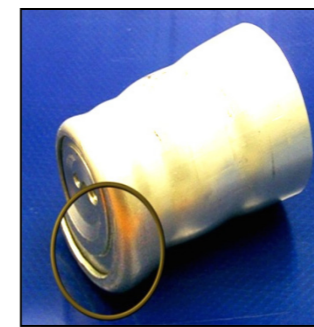
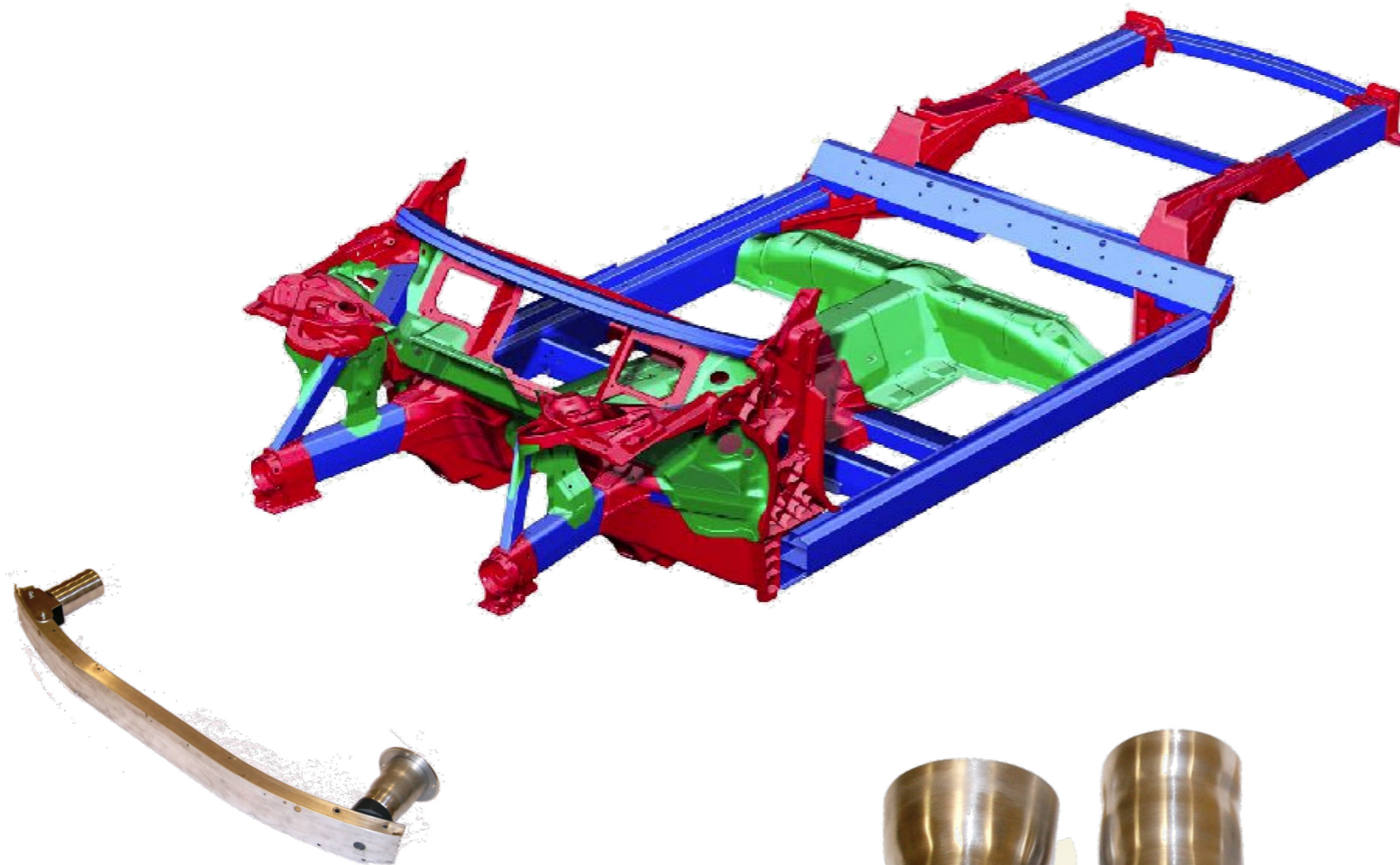


Hybrid cockpit carrier

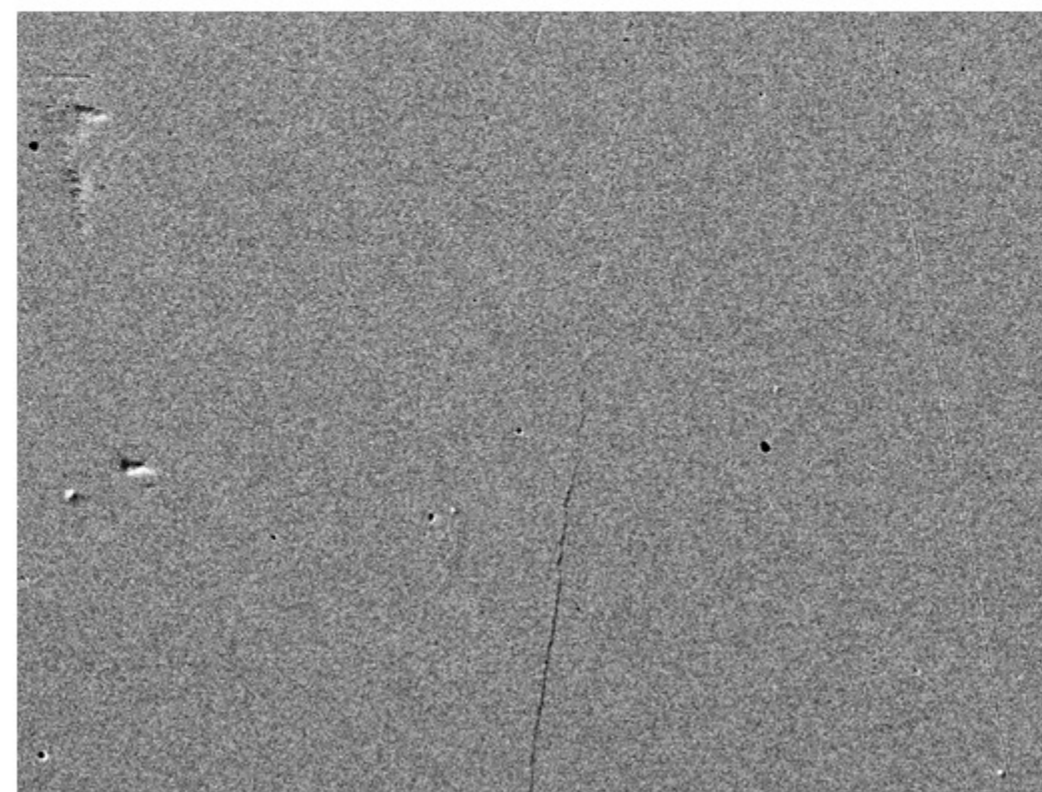


EMPT automotive structures

Deformation elements (crash boxes) by PSTproducts



Electromagnetic Pulse Welding (EMPW)



ODS: Oxide dispersion strengthened steel



Sales Options

1 **Classic sale** of a system:
Pulse generator, coil, fixture (up to semi-automatic)

*High volume production
and Technical Centre*

2 **Pay Per Pulse:**

High volume production

The pulse generator will be supplied **inclusive maintenance and spare parts** over 5 years. A monthly minimum number of pulses is required. Monthly bills. Optional purchase after 24 months.

3 **Leasing with subsequent option to purchase:**

*Excellent for use in a
Technical Centre*

As Topic 1, but financed via a financial partner of PSTproducts GmbH. For machines in a Technical Centre PSTproducts offers to include an **engineering hours call-off contract**.



Thank you!

Thank you!

**The Industrial Application of the
Electromagnetic Pulse Technology
(EMPT)**

International Conference and User Meeting
including Tour of Production Facilities
and Demonstration

22 April 2010, Alzenau, Germany

English / German with simultaneous translation

www.pstproducts.com

