



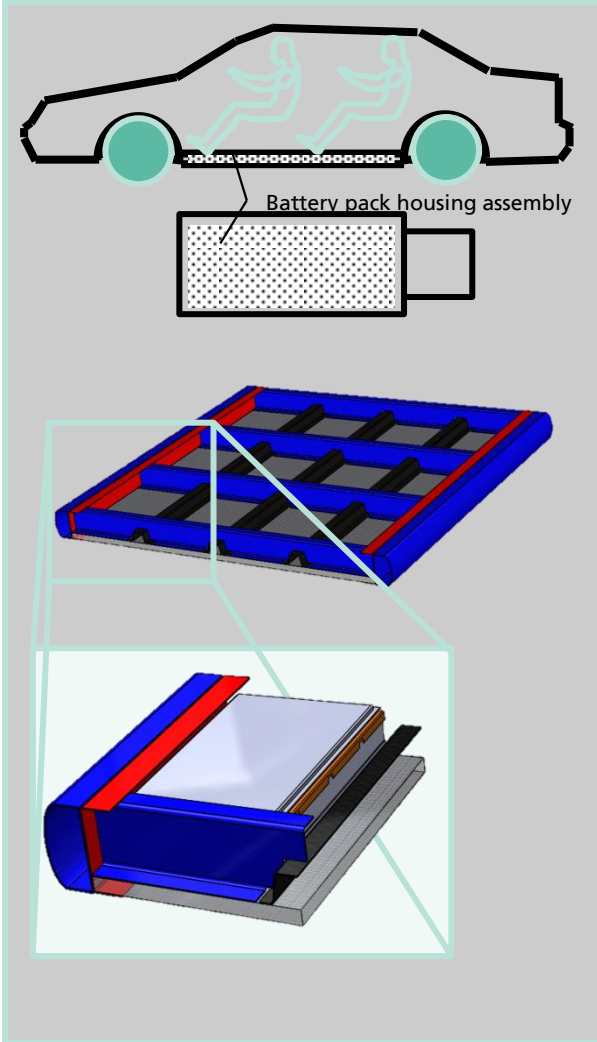
# Generic thermoplastic body floor for electric vehicles

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Fraunhofer Institute for Production Technology IPT

Aachen, 13<sup>th</sup> April 2016

# Generic thermoplastic composite body floor for electric vehicles



Side panel:  
Tape placement

Sandwich structure:  
Local reinforcement

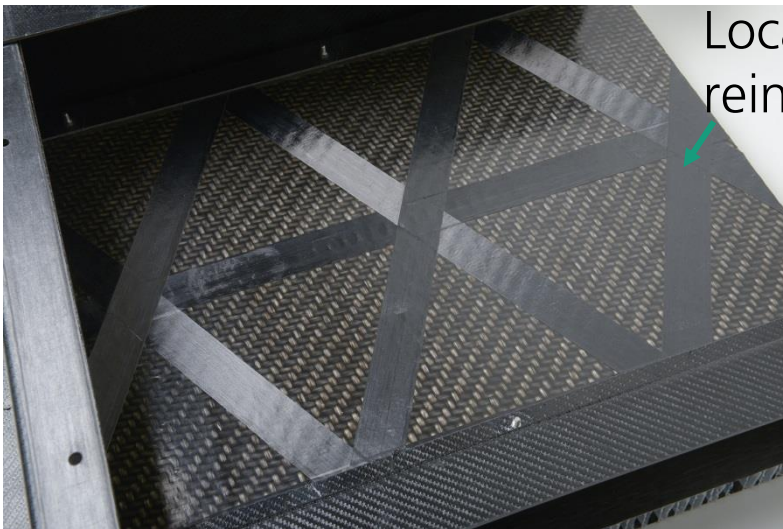
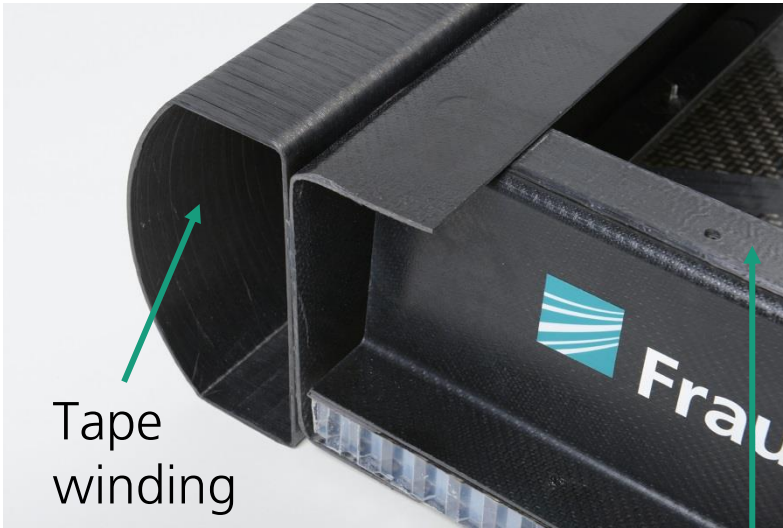
Profiles:  
Thermoforming &  
Local reinforcement

Joining:  
Insert integration  
Ultrasonic welding



# Generic thermoplastic composite body floor for electric vehicles

## *Laser-assisted tape placement / winding*

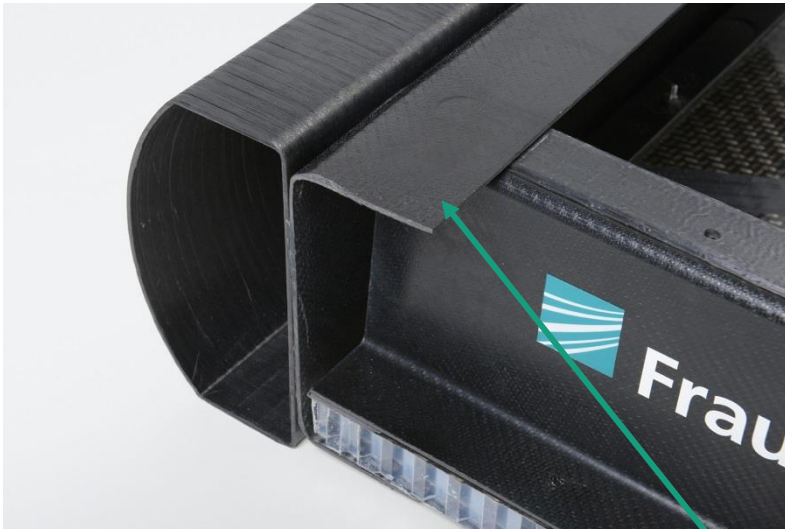


Tape winding / placement

- Load and weight optimized design
- Complex tubular geometries are feasible
- Placement speeds of over 1 m/sec
- Selective reinforcement enables
  - Multi-material solutions
  - Significantly improved mechanical properties
  - Efficient material usage

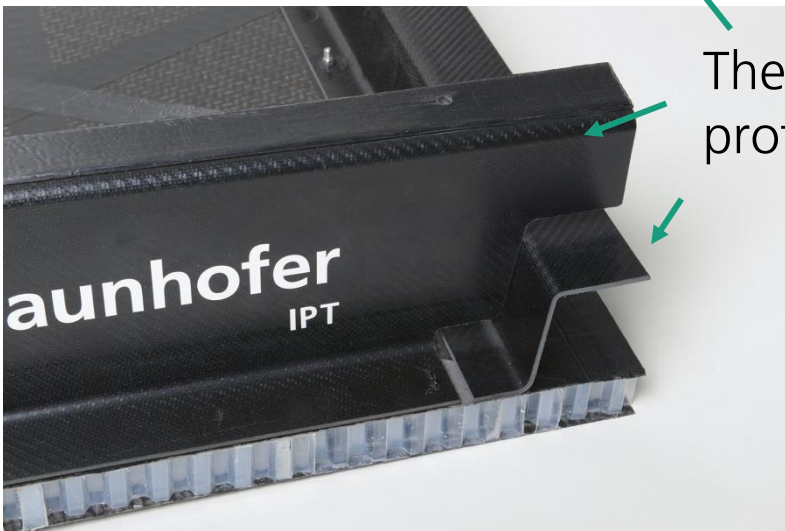
# Generic thermoplastic composite body floor for electric vehicles

## Thermoforming



### Potential

- Efficient process / short cycle time
- Combination with further processes
  - Insert integration
  - Trimming
  - Joining



Thermoformed profiles

# Generic thermoplastic composite body floor for electric vehicles

## *Joining via inserts*



### Potential

- Fiber fair bionic process (forked branch principle)
- Joining strength: **+ 35.8 %**
- Part strength: **+ 62.5 %**
- Energy absorption till final failure: **+ 168 %**
- Economic efficiency due to parallelized functionalization
- Process is suitable for large volumes
- Minimized tool wear
- Undercuts / form fit of inserts are feasible

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## *Joining via ultrasonic welding*

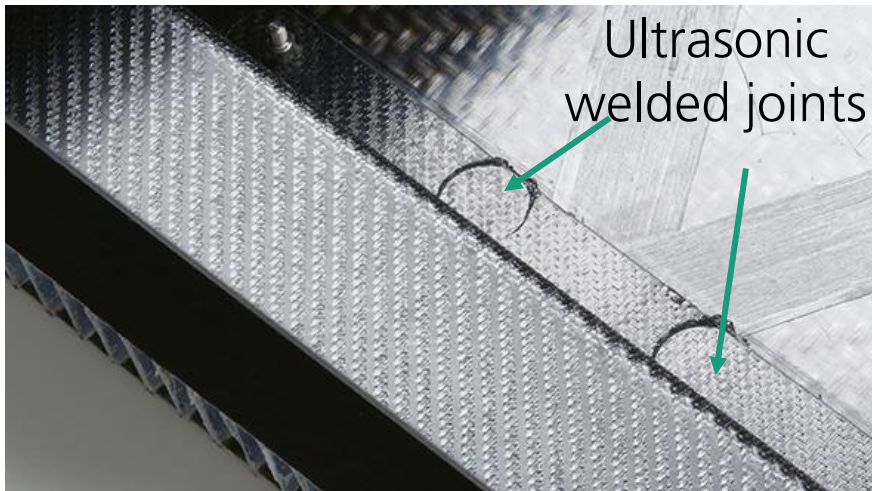


### Innovation

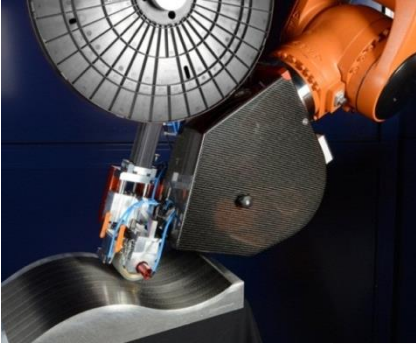
- Utilization of unidirectional fiber reinforced tapes as ED (energy director)
- Application of ED with laser assisted tape placement head

### Advantages

- Standard materials
- Process technology is established



# Your contact



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