



APPROVED IN AVIATION. READY FOR RAIL.

Composite solutions for rail and
road transportation

DID YOU KNOW ...

that EFW has been developing, producing and delivering tram components since 2009

that EFW produces more than

35,000

components per month

that EFW's rail composite components operate on two continents – Australia and Europe.



that EFW's innovative drop-in panel design ensures weight savings of up to

50%

that EFW provides all services from the idea to the delivery of ready-to-install products



EFW AT A GLANCE

OUR 4 BUSINESS UNITS



COMPOSITE SOLUTIONS



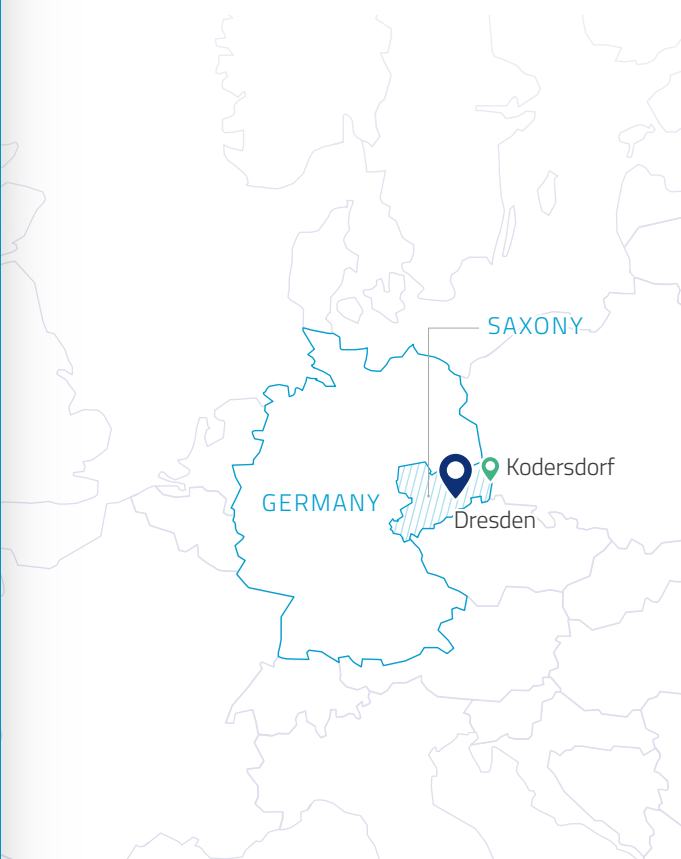
MAINTENANCE REPAIR AND OVERHAUL



FREIGHTER CONVERSION



ENGINEERING SERVICES



- > Based in Dresden, Germany
- > 1,700 employees
- > Revenues of € 300 million
- > A company of ST Engineering (55%) and Airbus (45%)
- > Experience in aviation industry in Dresden since 1955
- > 2 additional production sites in Kodersdorf, Germany: acosa and CCI-A



strength



reliability



non-toxicity



environment



serviceability



integration



customization



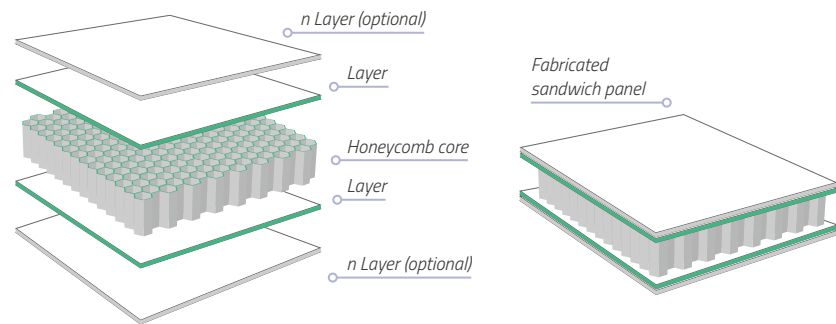
3D

COMPOSITE RAIL AND ROAD COMPONENTS

LAY-UPS

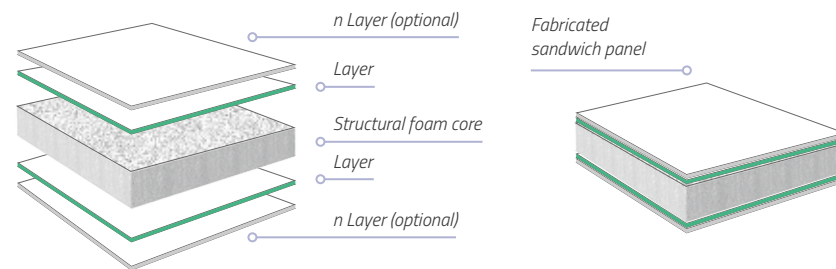
CLASSIC LAY-UP

Classic sandwich panel lay-up is built by two main elements: preimpregnated glass fibre layers and a honeycomb core.



SMART LAY-UP

Smart sandwich panel lay-up combines preimpregnated glass or carbon fibre layers and a foam core.

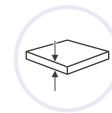


PRODUCT PERFORMANCE

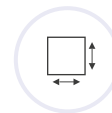
DIMENSIONS



weight
2 – 8 kg/m²



thickness
7 – 50 mm



length & width
As desired

TEMPERATURE



fire & smoke
FST according to
DIN EN 45545-2

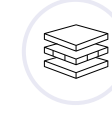


operating
temperature
-25 – +55 °C



temperature
resistance
-35 – +70 °C

MECHANICAL & PHYSICAL PROPERTIES



thermal insulation
3,5x more energy
efficient*

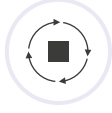


acoustics
> 29 dB
isolation



stiffness
3x stiffer*

SPECIAL FEATURES



product lifetime
32 years



certifications
DIN EN 9100
DIN 6701

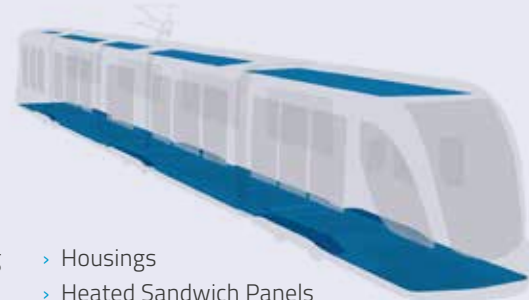


design elements
Selective and area
reinforcement edge
protection, floating
inserts, panel
connection elements,
heatable

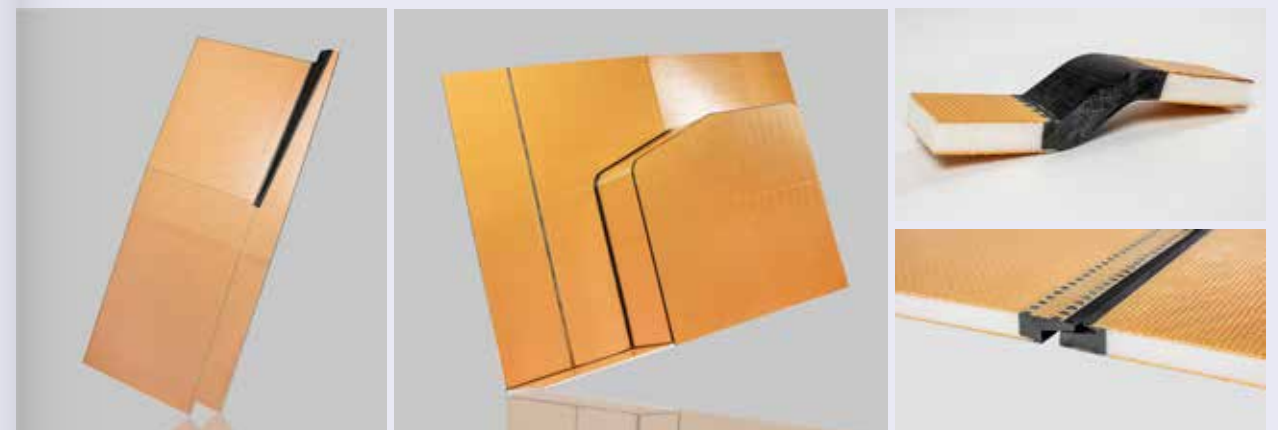
* compared to plywood flooring

PRODUCT PORTFOLIO

EFW's sandwich panel lay-up is optimized for interiors and load carrying structure of rail and road transportation.

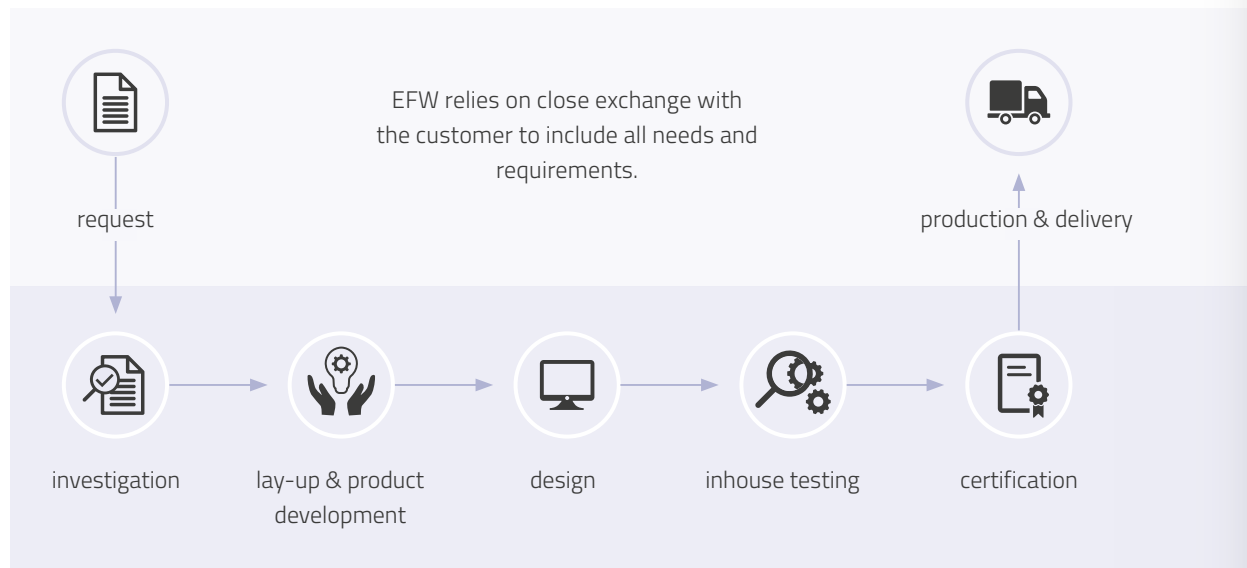


- > Floor Panels
- > Floor Panels with Bonded Covering
- > Complex Floor Systems
- > Linings
- > Partition Walls
- > Housings
- > Heated Sandwich Panels
- > 3D Components
- > Ceiling Panels



WORKFLOW

Together with our customer from IDEA to READY-TO-INSTALL-PRODUCT



WHY USING EFW'S COMPOSITES IN TRANSPORTATION?

<p>MANUFACTURING</p> <p>From flat panels to 3D parts and from single panels to complex systems using various manufacturing options</p>	<p>CUSTOMIZATION</p> <p>Optimized lightweight construction according to customer requirements to carry high loads adapted to every vehicle type</p>	<p>WEIGHT</p> <p>Lightweight ensures weight savings of up to 50%</p> <p>Positive impact on CO₂ footprint</p>
<p>RELIABILITY</p> <p>Proven top reliability under the toughest conditions</p> <p>Free from degeneration under external influences</p>	<p>CHARACTERISTICS</p> <p>Outstanding thermal insulation, noise absorption and fire safety properties</p> <p>Service life up to 32 years</p>	<p>FUNCTION INTEGRATION</p> <p>Customization by system integration</p> <ul style="list-style-type: none"> > Heating systems > Provisions for electrics, hydraulics, pneumatics and mechanical applications

CUSTOMER BENEFITS

EFW covers the entire value-added chain in composite manufacturing.



6 MAIN REASONS TO BUY OUR PRODUCTS

- Joint product development according to **your requirements and specifications**
- High **strength and stiffness** combined with **minimized weight**
- Wealth of knowledge** and **deep expertise**
- High **product quality** and **delivery reliability**
- Delivery **just in time, ready to install**, with all **needed functions**
- Services from **R&D through production to installation**

GET AN IMPRESSION OF OUR CAPABILITIES



Quality assurance with highest precision



Product adaptation according to customer requirements



Highly automated manufacturing



State-of-the-art 3D metrology

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