

FEV Signature Solutions

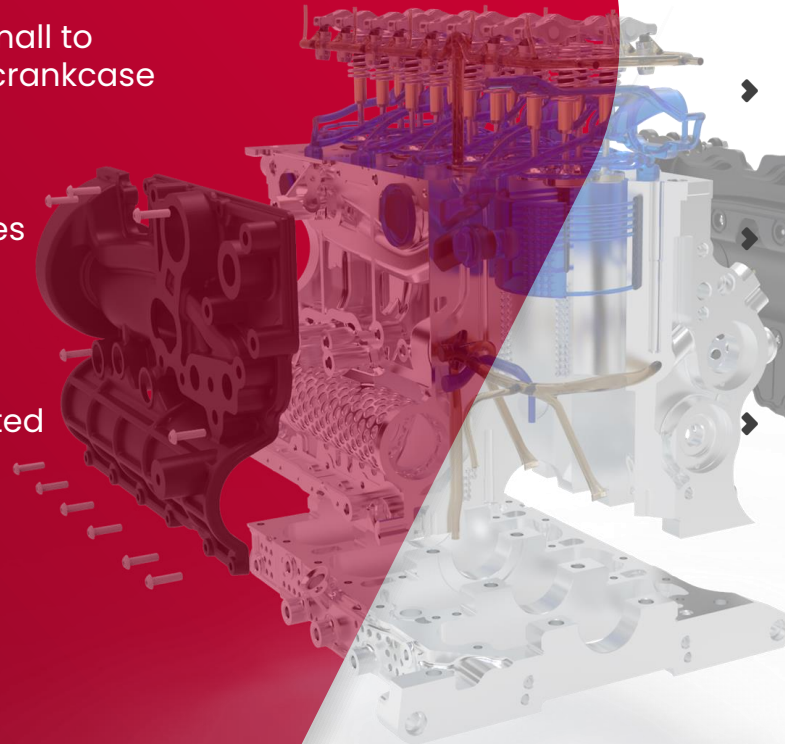
Lightweight design and additive manufacturing



Borderline lightweight design and increased engine efficiency with improved thermal management for your powertrains

FEV offers

- ▶ Lightweight structural concepts from small to large powertrain components such as crankcase and cylinder head
- ▶ Additive manufacturing designs with bionic and engineered cellular structures
- ▶ Hybrid material solutions, e.g. metal parts combined with plastic structures
- ▶ Optimization of fluid channels for targeted cooling and higher engine efficiency



Why FEV

- ▶ **Proven expertise:** 45+ years of automotive engineering excellence, trusted by global OEMs and Tier-X suppliers to deliver innovative, production-ready solutions with deep domain expertise, e.g. in design as well as virtual and physical validation of powertrains from passenger car to large commercial applications
- ▶ **Pioneer** in developing the largest ICE components specifically designed using the benefits of additive manufacturing
- ▶ **Complete lifecycle support:** From concept to series maturity, including design, simulation, prototyping, testing, industrialization, and implementation
- ▶ **Customer-centric solutions:** Transparent and customizable, enabling you to extend, integrate, and scale your own development

Reference project

LeiMot

FUNDED RESEARCH PROJECT

Development of a lightweight aluminum passenger car crankcase and cylinder head for additive manufacturing with functional improvements

FEV involvement

- Head of the project consortium
- Definition of the overall concept
- Design of the cylinder head and crankcase including bedplate
- Validation of the manufactured prototypes on the engine test-bench

Mass reduction

Crankcase and cylinder head with 20 to 30% lower mass compared to reference components from series production

Cooling design

Cooling channel concept reduces the max. flame deck temperature at rated power by 40 °C with 40% lower coolant flow rate compared to the reference engine



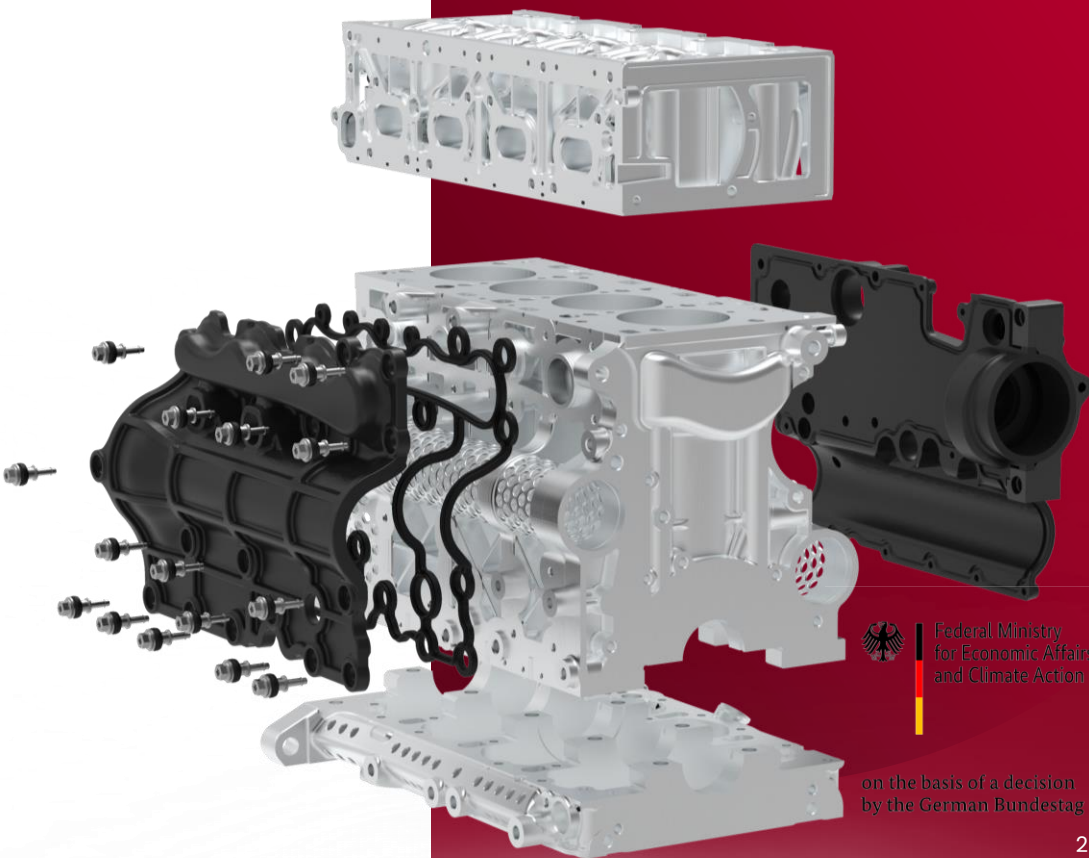
Exhaust Channel
Thermomanagement
DE 102020003393 A1

Related Patent Applications

Cylinder Head
Cooling Channel
DE 102020003394 A1

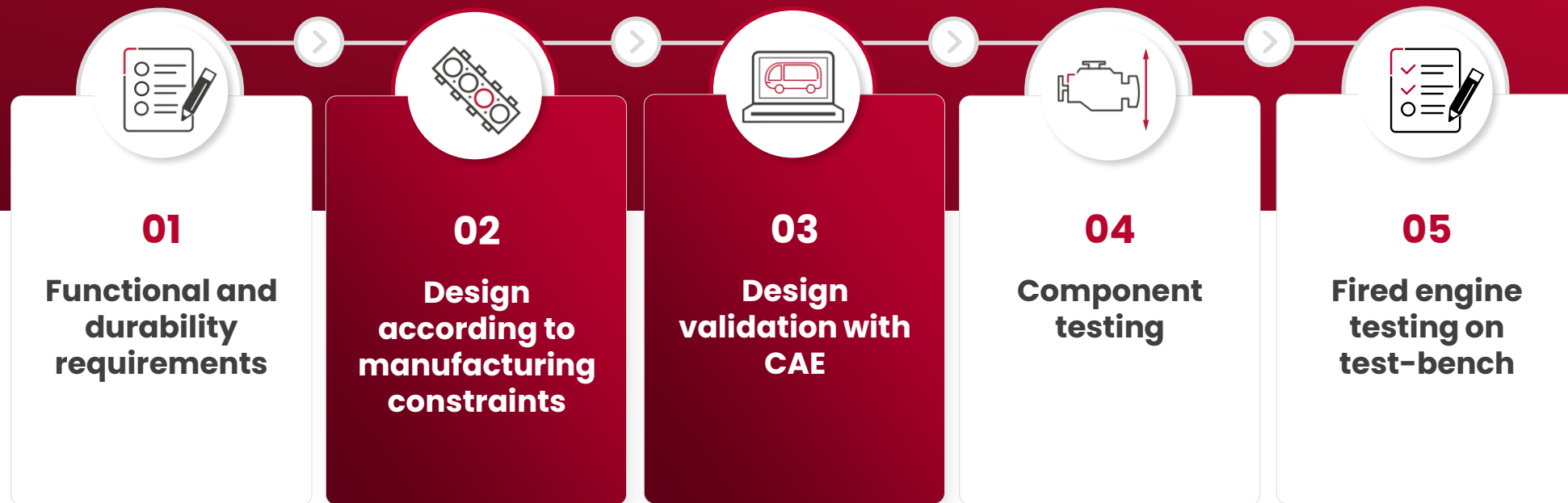
Cylinder Bore
Cooling
DE 102020006256 A1

Lightweight
Cylinder Head
DE 102023001162 A1



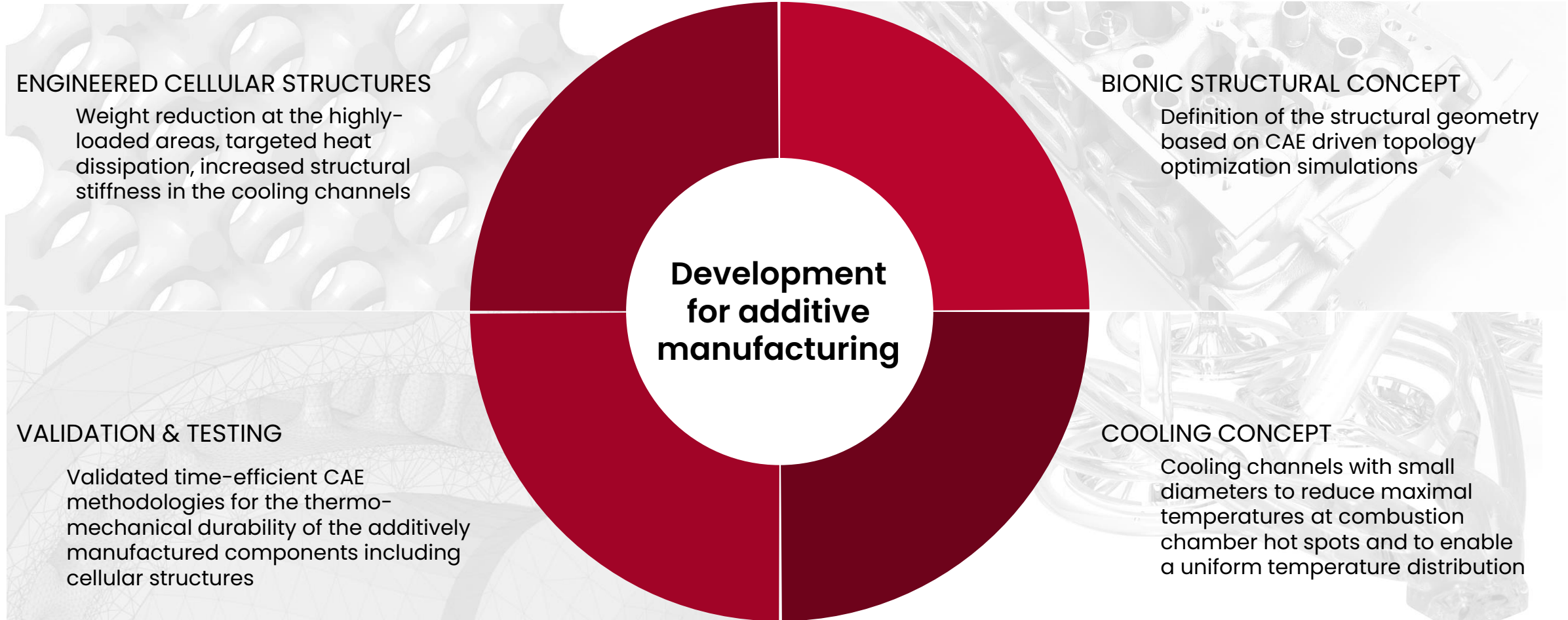
Complex requirements on highly-loaded powertrain components necessitate appropriate design and validation methods

FEV ADDRESSES THIS CHALLENGE WITH ITS HOLISTIC DEVELOPMENT APPROACH



Our design and simulation process enables time-efficient development of the largest ICE components with lowest mass and superior thermal behavior

KEY FEATURES OF FEV'S CRANKCASE AND CYLINDER HEAD DEVELOPMENT PROCESS FOR ADDITIVE MANUFACTURING



Get in touch with us for further information



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