

CORE 4.0 PROJECT ROAD MAP



PROPOSAL

Consortium, key partners

- Fagor Ederlan (Spain). Industry
- Rauschert Italia (Italy). Industry
- Ferročrtalič (Slovenia). SME
- Renault (France). Industry
- Fundación Tecnalia R&I (Spain). RTD

TRL 6- Technology of aluminium blocks by HPDC using ceramic cores demonstrated in relevant environment

CORE 4.0 Fast Track to Innovation PROJECT

HPDC-LC technology implementation for the manufacturing and commercialization of a new Closed-Deck AI block for the M9T engine

TRL 7- Aluminium Cylinder Block prototype tested and validated at Fagor Ederlan
TRL 8- Aluminium Cylinder Block tested and validated in engines at Renault

MARKET

Business with capacity of producing and commercializing 75,000 cylinder blocks in 2019 and 200,000 units from 2022 on will be start up

Fabrication of large series of Closed-Deck Cylinder Block

September 2015

April 2016

November 2018

November 2019



Nº 701197

Engine block manufacturer

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Ceramic core manufacturer

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Rauschert

De-coring equipment manufacturer

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RENAULT
Passion for life

Technology provider

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tecnalia Inspiring Business

TECHNOLOGY FOR NEXT GENERATION ENGINES

CORE 4.0



<http://core40-project.eu/>

New Innovative aluminium Closed-Deck block produced by High Pressure Die Casting (HPDC) Lost Core (LC) technology

EU Legislation

Ever-stricter regulations in terms of emission of CO₂ (< 95 g CO₂/km), NO_x and PM_{2,5} for all new cars registered from 2020

Proposed Solution

Substitution of Cast Iron block by innovative aluminium Closed Deck block produce by **HPDC-LC technology**

Value proposition Benefits



EMISSION REDUCTION

70% lighter blocks



COST

30% lower production cost



PERFORMANCE/DESIGN

High performance complex designs



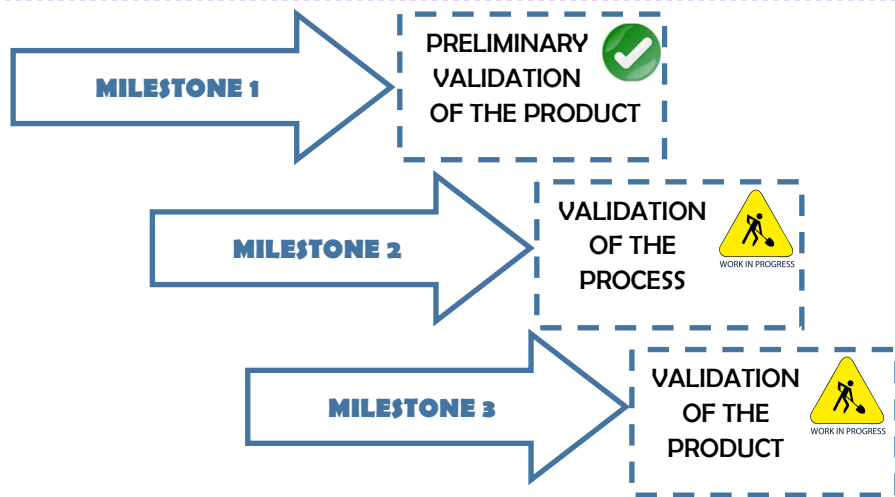
GREENER PRODUCTION PROCESSES

Increased recyclability



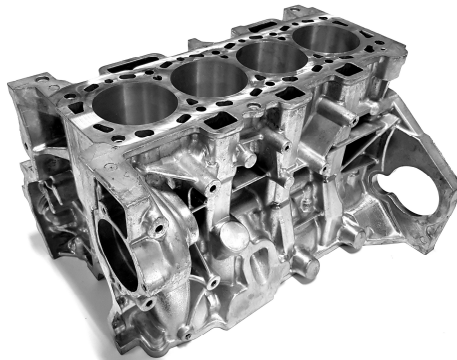
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 701197

CORE 4.0 TECHNICAL WORK AND MILESTONES



PRELIMINARY VALIDATION OF THE PRODUCT

The first milestone has been achieved with the manufacturing of 40 closed-deck engine block prototypes ready to be used in the testing and validation process



VALIDATION OF THE PROCESS

The process is being optimized to be able to produce blocks with a high productivity rate and a high yield.

VALIDATION OF THE PRODUCT

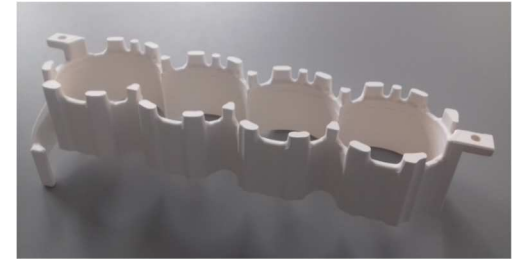
Engine blocks will be assembled in Renault's M9T engine prototype, which will be mounted in the test bench to be subjected to 6-month-long endurance tests.

CORE 4.0 MAIN DEVELOPMENTS

CERAMIC CORE

A ceramic core to be used in high pressure die casting processes has been developed. Characteristics:

- Good surface finish
- Enough bending strength to withstand the pressure of the die casting process
- Enough porosity to make possible the de-coring



CLOSED-DECK ALUMINIUM ENGINE BLOCK



A HPDC die has been designed and manufactured and the casting parameters have been optimized for the production of 40 engine blocks with this innovative technology.

Characteristics:

- Good soundness of the part
- Good surface finish in the cylinder bores

DE-CORING MACHINE

A machine based on the ultra high pressure water cleaning technology has been developed to remove the cores from the engine blocks. Characteristics:

- Automatized and synchronized process
- Core removal from internal and secluded regions
- Minimization of particular procedure flaws through coordinated control
- Attainment of residues-free workpiece

