



# REWARD

REal World Advanced Technologies for Diesel Engines

EUROPEAN COMMISSION

Horizon 2020

H2020-MG-2014-2015

GA No. 636380



<b>Deliverable No.</b>	REWARD 3.16	
<b>Deliverable Title</b>	Updated Base Engine HW available	
<b>Deliverable Type</b>	REPORT	
<b>Dissemination level</b>	Confidential – member only (CO)	
<b>Written By</b>	Giorgio Rustici (CRF) Marco Tonetti (CRF)	
<b>Status</b>	<b>Final</b>	
<b>Checked by</b>	Ricardo Brugnara (SCF) WP3 Leader	2017-04-05
<b>Submitted to Executive Board</b>	Submitted	2017-04-07
<b>Approved by Executive Board (EB)</b>	Approved and accepted by all members of Executive Board at meeting EB20	2017-04-21

H2020-MG-2014-2015 – 636380 – REal World Advanced Technologies for Diesel Engines

**Acknowledgement:**

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

**Project partners:**

- 1 - AVL - AVL List GmbH - AT
- 2 - REN - Renault SAS - FR
- 3 - VCC - Volvo Car Corporation - SE
- 4 - CRF - CRF SCpA - IT
- 5 - CNRIM - Istituto Motori – Consiglio Nazionale delle Ricerche (CNR) - IT
- 6 - JM - Johnson Matthey Plc - UK
- 7 - RIC - Ricardo Plc - UK
- 8 - SCF - Schaeffler AG - DE
- 9 - LMM - Le Moteur Moderne - FR
- 10 - DELPHI - Delphi Automotive Systems Luxembourg S.A. - LU
- 11 - UNR - Uniresearch BV - NL
- 12 - IFPEN - IFP Energies Nouvelles - FR
- 13 - VIF - Virtual Vehicle Research Center - AT
- 14 - CTH - Chalmers Tekniska Högskola - SE
- 15 - CTU - Czech Technical University - CZ
- 16 - UPVLC - Universitat Politecnica de Valencia – Motores Termicos – ES

**Disclaimer:**

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 636380.*



## Publishable Executive summary

Within the WP3, the subtask 3.2.1 is focused on the optimization of the CRF multicylinder engine based on Fam.B FCA 1,6l in terms of frictions and combustion system.

Main features of the new combustion system have been defined based on IPEN indications from 3D CFD simulations and activity at single cylinder engine and previous CRF experiences. Aspects of combustion system that have been take into consideration in the development process are: combustion bowl geometry, fuel injection system and swirl level.

5 different combustion systems have been defined and tested at the engine test bench in full load conditions and in partial load. At partial load the target was the minimization of the fuel consumption and smoke emission without any deterioration of combustion noise and NOx emissions. The comparisons between the different solutions have been carried out by Design of Experiment that allowed the optimization of the engine calibration in each test.

The document describes the criteria adopted, gives a summary of the experimental activity performed and shows the characteristics of the new system.