



Heavy Duty Gas Engines integrated into Vehicles

EUROPEAN COMMISSION

Horizon 2020

H2020-MG-2014

GA No. 653391



Deliverable No.	HDGAS D2.8	
Deliverable Title	High pressure LNG pump prototype	
Dissemination level	Confidential (CO)	
Written By	Dominique Soleri (Westport) Nadège Leclercq (Westport)	2017-11-28
Checked by	Constantin Plikat (Daimler)	2017-11-30
Approved by	Gernot Hasenbichler (AVL)	2017-11-30
Status	Final	2017-12-01

H2020-GV-2014 – 653391 – Heavy Duty Gas Engines integrated into Vehicles

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 - BWR - Borgwarner Ludwigsburg GmbH - DE
- 3 - BOSCH - Robert Bosch GmbH - DE
- 4 - DAI - Daimler AG - DE
- 5 - DINEX - Dinex Ecocat OY - DK
- 6 - FPT - FPT Industrial S.p.A. - IT
- 7 - IDIADA - Idiada Automotive Technology S.A.- ES
- 8 - IVECO - Iveco Espana SL - ES
- 9 - MAN - MAN Truck & Bus AG - DE
- 10 - POLIMI - Politecnico di Milano - IT
- 11 - RCD - Ricardo UK Limited - UK
- 12 - SAG - SAG Motion GmbH - AT
- 13 - TNO - Nederlands organisatie voor toegepast natuurwetenschappelijk onderzoek - NL
- 14 - TUG - Technische Universiteit Graz - AT
- 15 - UEF - ITA-Suomen Ylipisto (University of Eastern Finland) - FI
- 16 - UASE - Hochschule Esslingen - DE
- 17 - UNR - Uniresearch BV - NL
- 18 - VOLVO - Volvo Technology AB - SE
- 19 - VIF - Virtual Vehicle Research Center – AT
- 20 - WESTPORT – Westport Power France – FR

Disclaimer:

This project has received funding from the European Union's Horizon 2020, programme for research, technological development and demonstration under grant agreement no 653391.



Executive summary

Within the HDGAS project, Westport is responsible for developing the LNG pump for the Volvo LNG system concept. The HDGAS Volvo concept features high pressure direct injection of natural gas into the combustion chamber and requires pressure level of approx. 300 bar.

For this pump prototype development, Westport relied on its long standing experience in submerged high pressure LNG pumps for heavy duty and high horsepower mobile applications. The starting point and baseline was the Westport™ HPDI 2.0 truck system and more particularly its P20 LNG pump. Expected technology achievements in the HDGAS project are in increased pump lifetime and a path to a high pressure LNG system where the system is capable of reducing tank pressure during operation when it is above a certain level.

Like the P20 LNG pump, the new high pressure pump is a hydraulically driven, linear piston pump. The developments performed within the HDGAS project were primarily focused on the cryogenic section of the pump to improve pump durability and impact on tank conditions. LNG pump improvements for the HDGAS pump prototype included pump intake, discharge line, hydraulic piston and valve and prototype shaft.

Development, component sourcing, assembly and testing of the new prototype pump were performed for the HDGAS project using internal design tools, assembly and testing capabilities. The performance tests were run on LNG as the test fluid, using a harsh test cycle based on a steep route with a high load factor. Testing was completed with the HDGAS pump as well as a baseline pump.

Under these controlled testing conditions, the enhanced pump developed for the HDGAS project has shown promising results when compared against the baseline Westport™ HPDI 2.0 LNG pump. Reductions in tank pressure rise or better yet, reductions in tank pressure during operation were observed. Further evaluation remains to be performed during and after completion of the road tests on the Volvo truck in order to confirm that the expected technology improvements of the new pump are achieved.

Acknowledgment



This project has received funding from the European Horizon 2020 Programme for research, technological development and demonstration under grant agreement no 653391