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Electric vehicle user-centric design for optimised energy efficiency

GRANT AGREEMENT No. 769902

DOMUS

Design OptiMisation for efficient electric vehicles based on a
USer-centric approach

DOMUS – Deliverable Report
D4.4 Weight-optimized Door Panels

Deliverable No.	DOMUS D4.4	
Related WP	WP4	
Deliverable Title	Weight-optimized Door Panels	
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Change Log

Version	Modifications of document	Author	Date
1.0		Jean-Christophe LE FLOHIC (FIS)	14-10-2020
2.0	Add sections 1,3,4 and 5	Jean-Christophe LE FLOHIC (FIS)	05-03-2021
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Publishable summary

Three innovative concepts are proposed to reduce the mass of the door panels and of other components located in the cabin or in the trunk.

Microject

The door panels of the FIAT 500e are made of a 10% mineral filled Polypropylene. The Microject process consists in replacing this injection molded Polypropylene by a Polypropylene that has a lightweight microcellular structure. The potential mass reduction of the FIAT 500e door panels is of 1730 g (20 %). The objective was a mass decrease of 5 to 10%.

NFPP back injected

If a door panel component is covered with a decoration film, another way of reducing its mass is to replace the injection molded Polypropylene by a material made of natural fibers (flax/hemp/kenaf) and Polypropylene fibers. Although the new part must be reinforced by PP-GF ribs, the potential mass reduction of the FIAT 500e door panel armrests is of 450 g (37%).

The objective was a mass decrease of 0.5 to 1.5 kg.

Hybrid foam

In most of the cars, some insulation material is fixed on the firewall, between the cabin and the engine compartment, to prevent the noise generated by the motor from reaching the occupants. The Hybrid foam innovative concept is aimed at manufacturing lightweight insulation panels. This idea can lead to a 1.5 kg (27 %) mass reduction of the FIAT 500e insulator.

The objective was a mass decrease of 0.5 kg.

5 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:

#	Partner	Partner Full Name
1	IDIADA	IDIADA AUTOMOTIVE TECHNOLOGY SA
2	CRF	CENTRO RICERCHE FIAT SCPA
3	TME	TOYOTA MOTOR EUROPE
4	Volvo Cars	VOLVO PERSONVAGNAR AB
5	AGC	AGC GLASS EUROPE SA
6	DNTS	DENSO Thermal Systems S.p.A.
7	Faurecia	Faurecia Sièges d'Automobile
8	HUTCH	HUTCHINSON SA
9	IEE	IEE International Electronics & Engineering S.A.
10	LIST	LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY
11	COV	COVENTRY UNIVERSITY
12	Fraunhofer	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
13	IKA	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
14	TECNALIA	FUNDACION TECNALIA RESEARCH & INNOVATION
15	VIF	Kompetenzzentrum - Das Virtuelle Fahrzeug, Forschungsgesellschaft mbH
16	UNR	UNIRESEARCH BV
17	FIS	Faurecia Interieur Industrie
19	FCA	Fiat Chrysler Automobiles Italy SPA



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6 Appendix A – Quality Assurance

The following questions should be answered by all reviewers (WP Leader, peer reviewer 1, peer reviewer 2 and the technical coordinator) as part of the Quality Assurance Procedure. Questions answered with NO should be motivated. The author will then make an updated version of the Deliverable. When all reviewers have answered all questions with YES, only then the Deliverable can be submitted to the EC.

NOTE: For public documents this Quality Assurance part will be removed before publication.

Question	WP Leader	Technical Coordinator
	JC. LE FLOHIC	IDIADA
1. Do you accept this deliverable as it is?	Yes	Yes
2. Is the deliverable completely ready (or are any changes required)?	Yes	Yes
3. Does this deliverable correspond to the DoW?	Partially : a- the sub-task 4.2.1 Microject was initially part of the report D4.3 Weight-optimized Dashboard b- the Flaxpreg concept turned out to be not applicable.	Partially : a- the sub-task 4.2.1 Microject was initially part of the report D4.3 Weight-optimized Dashboard b- the Flaxpreg concept turned out to be not applicable.
4. Is the Deliverable in line with the DOMUS objectives?	Partially : No CAD models of the proposed innovations have been done, based on the FIAT 500e.	Partially : No CAD models of the proposed innovations have been done, based on the FIAT 500e. Yes / No (motivate) Yes / No (motivate)
a. WP Objectives?		
b. Task Objectives?		
5. Is the technical quality sufficient?	Yes	Yes