AeroSolfd
filtration devices

SELECTION of VEHICLES and ENGINE FAMILIES

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DOCUMENT HISTORY

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Project Coordinator	M+H		
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Deliverable No.	D1.1 Matching retrofit particle filter with 4 representative engine families, ready for installation		
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Work Package Lead	VERT		
Contributing	HJS, TÜV, BFH, CPK, G-Technologie and Technion		
DoA	Matching retrofit particle filter with 4 representative engine families, ready for installation. This deliverable refers totask 1.1		

DATE	VERSION	AUTHOR	COMMENT
05/10/2023	1	T.Lutz L.C. Larsen	First draft of deliverable
18/10/2023	2	L.C. Larsen	Final version

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Co-funded by the European Union

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LIST OF ABBREVIATIONS

ACRONYM	DESCRIPTION
TRL	Technology Readiness Level
EURO	European class. -system for emissions standards
DI	Direct Injection of Diesel
PFI	Port Fuel Injection of Diesel
GPF	Gasoline Particle Filter
PM	Particle Mass
PN	Particle Number
PEMS	Portable Emissions Measuring System
BFH	Berner Fachhochschule Biel/Bienne CH
PAH	Polycyclic Aromatic Hydrocarbons
NOx	Nitrogenoxides and Nitrogendioxides (pooled)

PUBLISHABLE SUMMARY

The main objective of Deliverable 1.1 in Work package 1 is to match, identify and select a range of vehicles equipped with engine type and configuration that is representative for the European fleet potentially eligible passenger cars for retrofit of a gasoline particle filter (GPF).

It is commonly recognised that a large contribution to air pollution of NOx and particles are due to older vehicles with older and lower efficiency emission control technology and especially to vehicles that are not in- use compliant. By retrofitting older vehicles with a GPF the highest level of particle reduction can be achieved. NOx emissions to be reduced by the check and replacement of non-compliant Three-Way-Catalyst (TWC) in conjunction with the retrofit installation of the GPF.

With the correct match it is ensured that the test results are developed under realistic conditions and that the conclusion can be applied to the fleet of vehicles in the European markets and that a GPF retrofit solution can be successfully retrofitted. The GPF retrofit solution is only applicable to vehicle older that the European emissions classification for vehicles <3,5 tonnes, called Euro 6c which implies that the vehicles are old enough not to be fitted with a GPF from the factory, but not so old it would not be technically and economically feasible to install a retrofit solution.

By a thorough selection process where several critical factors have been contemplated, the matching has been successfully completed and a list of vehicles equipped with representative engine configurations has been compiled.

TÜV Hessen as an independent test authority, HJS as the exhaust system manufacturer, BFH and the Scientific committee of the International VERT association has been participating in this critical starting point of WP1.

The following vehicles have been selected:

- VW Golf
- Opel Corsa E
- Peugeot 3008
- FIAT 500x.

The vehicle list, the critical parameters and the contemplations behind the final selection and matching is described in detail in the deliverable.

1. INTRODUCTION

It is commonly recognised that a large contribution to air pollution of NOx and particles are due to older vehicles with older and lower efficiency emission control technology and especially to vehicles that are not in-use compliant. It is also now recognised that particle emissions, especially nano particle emissions are not only emitted from diesel powered engines but also gasoline engines without particle filtration devices. By retrofitting older vehicles with a GPF the highest level of particle reduction can be achieved. NOx emissions to be reduced by the check and replacement of non-compliant Three-Way-Catalyst (TWC) in conjunction with the retrofit installation of the GPF.

VERT is responsible for Work package 1 (WP1) in the Horizon Europe project – AeroSolfd supported by the European Commission under grant agreement #101056661-adressing the call CL5-2021-D5-01-15 with the objectives described below:

Table 1 Objectives of Work Package 1

Objective 1: Tailpipe retrofit solutions in TRL 8	
Specific objective 1.1:	Development and demonstration of cost-efficient (less than 10% of the vehicle market price) retrofit solutions for the direct-injected European gasoline fleet segment, which currently drives without any filter technology (EURO 6c and earlier) by month 32 (M32)
Specific objective 1.2:	To match the retrofit solutions to representative gasoline passenger car type families using highly efficient particle filters and adapting these technologies to a retrofit product portfolio by M9
Specific objective 1.3:	To validate experimentally the solution on 4 vehicle/engine types to demonstrate PN and NOx reduction by M12
Specific objective 1.4:	To measure secondary emissions (i.e. PAH, Nitro-PAH, NH_3, N_2O) using 1-2 exemplary vehicles to evaluate the impact of the retrofit filter by M18.
Specific objective 1.5:	To perform field tests with up to 50 vehicles to monitor the performance of the retrofit filter by usage of the vehicles by M25
Specific objective 1.6:	To measure particle number emissions of 1,000 cars during their regular emission check to determine the current PN emission status of a European gasoline DI fleet and identify the share of high emitting gasoline cars by M26
Related work package: WP1	
Key performance indicators for objective 1	
• Retrofit filter cost with less than 10% of the vehicle market price and maximum 1,000 € including material and installation	
• Experimental validation of the solution on 4 vehicle/engine types	
• Particle number (PN) reduction of 95%. The NOx reduction evaluated by market available catalyst solutions	
• Field test using up to 50 vehicles (2 fleets in Europe and 1 fleet in Israel) for a minimum of 6 months to measure tailpipe particle emissions. Monitoring of tailpipe particle emissions every vehicle in a time interval of 2- 4 weeks.	

This document includes a description of the vehicle and engine matching to the purpose of testing & validating a retrofit particle filter solution for gasoline powered passenger cars with the euro classification of Euro 6b and onwards. The Document is Deliverable 1.1.

1.1. PURPOSE AND TARGET GROUP

The main purpose of Deliverable 1.1 in Work package 1 is to match, identify and select a range of vehicles equipped with engine type and configuration that is representative for the European fleet potentially eligible passenger cars for retrofit of a gasoline particle filter (GPF). The target group is the subsequent testing activity partners in WP1 to ensure reliable and valid test results and conclusions.

1.2. CONTRIBUTIONS OF PARTNERS

The Scientific committee of the International VERT association has been participating in this critical starting point of WP1. Non mentioned partners have not participated in this particular Deliverable. (Please refer to project organisation below).

1.2.1. PARTNER 1 TÜV

TÜV as an independent test authority with experience in the German fleet of relevant and available passenger cars assisted in the selection and matching of test vehicles.

1.2.2. PARTNER 2 HJS

HJS GmbH as the exhaust system manufacturer participated in the selection and matching process by evolution vehicle type and configurations with critical parameters of space envelope to ensure that retrofitting physically possible.

1.2.3. PARTNER 3 BFH

BFH participated in looking at matching vehicles with regards to available space to carry PEMS for the real driving emissions testing

1.2.4. PARTNER 4 VERT SCIENTIFIC COMMITTEE (SC)

the Scientific committee of the International VERT association has been participating in this critical starting point of WP1. VERT has assigned specific individuals of the SC and this deliverable is assigned to Thomas Lutz. VERT president Lars Chr. Larsen has been responsible for the document compilation.

Table 2 List of major contribution by partner

PARTNER SHORT NAME	CONTRIBUTIONS
HJS	Exhaust system configuration evaluation & vehicle identification
TÜV	Fleet analysis and vehicle availability
VERT SC	Engine configuration and engine compliance
BFH	Test ability and compliance

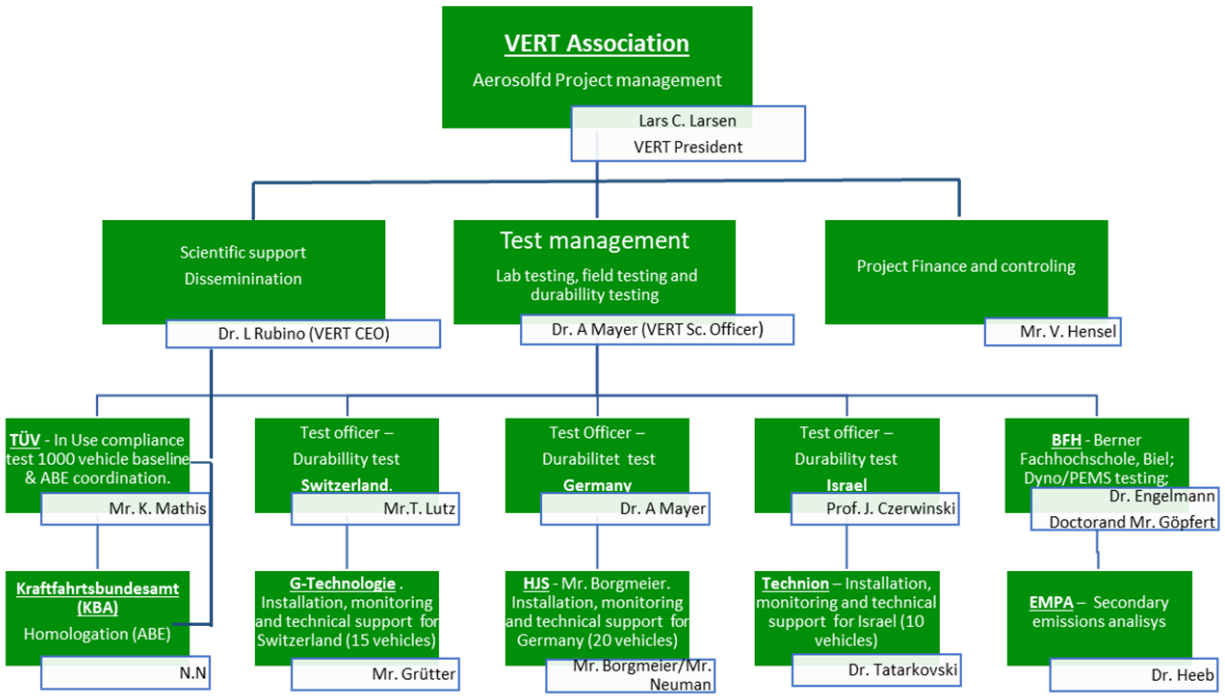

Figure 1 Project Organisation WP1

2. OBJECTIVES AND EXPECTED IMPACT

Objective is to identify a representative selection of vehicles, engine families and injection types that matches the technical and economical requirements to test a retrofit gasoline particle filter. In the scope of work package 1, it was decided that 4 engine families divided into a representative range of different vehicle brands and types should be identified.

2.1.OBJECTIVES

A list of representative vehicles that is matching the technical and economical requirements to ensure a valid and reliable outcome of WP1 – to provide a TRL-8 product to be successfully commercialised after completion of the project.

2.2.EXPECTED IMPACT

A valid and representative list of vehicles and engine families that can be successfully tested and validated with the overall impact improving air quality by eliminating particle emissions from in-use gasoline powered passenger cars.

3. DESCRIPTION OF TECHNICAL/SCIENTIFIC ACTIVITIES

3.1. INITIATION OF THE IDENTIFICATION PROCESS

The VERT WP1 organisation was put to work to identify the relevant vehicles and engine families. The work was conducted in conjunction with the scientific committee and TÜV in Germany, Switzerland, and Israel to ensure correct match from a technical point of view but also availability/occurrence in the relevant markets.

4. RESULTS AND DISCUSSION

In the following section, the process, the requirements, and outcome are described. Starting point is the VERT working document of 18.10.2022 see Annex 0. (Period of activity in brackets).

4.1. ENGINE/VEHICLE REQUIREMENTS – SUMMARIZED

- DI engines (Petrol), pre-Euro 6d (2017-2019), later extended to PFI engines
- High mileage – meaning 50. 000 km. or more
- To fit with available substrate (Corning GC2.0/200 CPSI, Ø4.05” x 4.72” and Ø5.20” x 5.47”)
- Adequate mileage during test period – 5.000-10.000 km during the 6 months trial
- System architecture to allow for retrofit.
- Price range of vehicle to accommodate a retrofit solution to represent <10% market value[1]
- Vehicle brand, type – model to be representative – no special configurations (hybrid, 4-wheel drive)

Since most vehicles with DI engines from Euro 6b onwards are equipped with GPF, there is no need for retrofitting for such types of vehicles. This means that only DI vehicles registered before 1.9.2015 are eligible for retrofitting solutions. Moreover, such vehicles are already 8 years old by the time the project is completed, or even 10 years old by the time a retrofit regulation is available, which is likely to greatly reduce the benefit of a retrofit programme. In the case of PFIs, the starting position is clearly different. To date, a GPF has not been mandatory but many of PFI vehicles, especially the smaller ones when operated at higher loads, may possibly run rich when accelerating, and therefore very high PN emissions. Consequently, this adds to much greater weight in terms of the overall emissions from the petrol engine fleet and makes it worthwhile retrofitting of these vehicles.

4.2. LIST OF ELIGIBLE ENGINES

As a first step towards drawing up a list of vehicles to be considered for the endurance test, those engines from 4 different manufacturers that were in production in 2016, that met the specifications of the intended filters in terms of performance level and that, possibly with restrictions, have a certain stock in the vehicle population. Engines from Opel, Peugeot, Toyota and VW were listed (see Annex 1).

[1] Expected cost range 800-1.200 Euro

4.3.DETERMINING AVAILABILITY IN GERMANY

TÜV Hessen has clarified the sufficient availability of the individual vehicle/engine types in the Vehicle Register in Germany (FRG). (see annex 2). In view of the rather low distribution of Toyota, FIAT was considered as an alternative.

Following the AeroSolfd meeting held in Biel on 13.12.22 with all relevant stakeholders in the project, it was decided to replace Toyota with FIAT. Due to insufficient availability in Switzerland, the Opel Adam and the Ford Ka are to be removed from the list. And the FIAT 500, which is unsuitable for PEMS measurements due to lack of interior space for the PEMS measuring equipment, was to be replaced by the larger FIAT 500x .

4.4.RESTRICTION OF THE VEHICLE LIST BY HJS

HJS, the manufacturer of the conversion/retrofit kits, has presented a highly restricted list in two steps (annex 3 and 4) on the basis of the TÜV list, the vehicle stocks, the installation situation and the spare parts situation. Based on this information, the following vehicles were marked for procurement as priority vehicles to be subject to a special measurement programme at the FH Biel:

- VW Golf
- Opel Corsa E
- Peugeot 3008
- FIAT 500x.

4.5.VEHICLE LIST FOR THE SWISS TEST FLEET

On the basis of the list for possible test vehicles from HJS, the vehicles listed below have been published in a call for tenders for the search for test vehicles in Switzerland. The search was carried out by means of a letter issued and sent by FEDRO (Office for Roads) in July to 200 owners in eastern Switzerland with a total of 278 vehicles (see annex 5).

4.6. VEHICLE LIST FOR THE ISRAELIAN FLEET

To be identified later on the basis of vehicle list and identification in Germany and Switzerland

5. DEVIATIONS FROM THE PLAN

D1.1. is delayed approx. three months compared to original time schedule. Because WP1 is sponsored by the Swiss SERI. The Final approval and consent were received in September approx. 3 months later than other related WP`s in the AeroSolfd project. This delay will have impact on other Deliverables under WP1 but not on overall time schedule and other WPs.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. FINAL VEHICLE LIST

Table 3 Vehicle list

OEM	Typ	displacement cm^3	Power kW	Year	Emissions-level
VW	Golf	1395	92	2016	Euro 6b
VW	Golf Sportsvan	1395	92	2016	Euro 6b
VW	Caddy	1395	92	2016	Euro 6b
VW	Passat	1395	92	2016	Euro 6b
Audi	A3 Limousine	1395	92	2016	Euro 6b
Opel	Corsa-E	1398	66	2016, 2017	Euro 6b
Opel	Corsa-E	1398	55	2016, 2017	Euro 6b
Opel	Corsa-E	1398	74	2016, 2017	Euro 6b
Peugeot	5008	1598	121	2016, 2017	Euro 6b
Peugeot	3008	1598	121	2016, 2017	Euro 6b
Peugeot	508	1598	121	2016, 2017	Euro 6b
Fiat	500 X	1598	81	2016, 2017	Euro 6b
Fiat	Jeep Renegade	1598	81	2016, 2017	Euro6b

Based on above list of vehicles equipped with the relevant range of engine families, 4 vehicles are identified for test and validation as per following tasks, objectives, deliverables, and milestones.

- VW Golf
- Opel Corsa E
- Peugeot 3008
- FIAT 500x.

7. BIBLIOGRAPHY

None

8. ANNEX

8.1.ANNEX 1 VEHICLE – ENGINE LIST

Testflotte – Motorenliste
(Basis: Fahrzeuge Bj. 2016)

Opel

Fahrzeugtyp	Motor	Motorbezeichnung	Einspritzung		Leistung [kW]
			PFI	GDI	
Corsa	1.4 l	B 14 XEL	x		66
		B 14 NEJ	x		74
		B 14 NEH	x		110
Astra	1.4 l	B 14 XFT		x	110
Meriva	1.4 l	B 14 XER	x		74
		B 14 NEL	x		88
		B 14 NET	x		103
Zafira	1.4 l	B 14 NEL	x		88
		B 14 NET	x		103
Mokka	1.4 l	A 14 NET	x		103

Peugeot

208	1.2 l		x		81
	1.6 l	EP 6 CDT		x	120
		EP 6 CDTX c		x	153
308	1.2 l	EB2	x		60
				x	81
		EB2 DTS		x	96
		EP6DT		x	115
				x	151
508	1.6 l	EP6C	x		88
		EP 6 CDT		x	121
2008	1.2 l	EB2	x		60
			x		96
3008	1.6 l	EP6C	x		88
		EP 6 CDT		x	121

Fahrzeugtyp	Motor	Motorbezeichnung	Einspritzung		Leistung [kW]
			PFI	GDI	
VW					
Polo	1.2 l	3-Zyl.	x		44
			x		55
				x	70
					81
	1.2 l	4-Zyl.		x	66
				x	81
	1.4 l			x	110
Golf	1.2 l	4-Zyl.		x	63
				x	81
	1.4 l			x	92
				x	110
	2.0 l			x	162
				x	195
Passat	1.8 l			x	132
Toyota					
Yaris	1.3 l	1NR-FE	x		73
Auris	1.2 l	8NR-FTS		x	85
	1.3 l	1NP-FE			73
	1.6 l	1ZR-FAE	x		97

Bemerkungen:

- **Citroen:** Nur der 1.6.-l-Motor stammt von Peugeot, ansonsten eigenständige Motorpalette

- **Skoda:** **Fabia:** 1.2-l- und 1.4-l-Motoren wie VW
Oktavia: 1.2-l-, 1.4-l- und 2-l-Motoren wie VW

- **Seat:** 1.2-l-, 1.4-l-, 1.8-l- und 2.0-l-Motoren wie VW

Quelle: Katalognummer 2016 der Automobilrevue

Typ / Type : **TBD**
Hersteller / Manufacturer : **HJS**

8.2.ANNEX 2 VEHICLE LIST GERMANY

Direct Injection

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels- bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
1	VW Group PC	(AU) E1*2007/46*0623*16 bis 21	VW GOLF	1395	92	CZCA	GAC4CZCAX0	2016	Euro 6b
2	VW Group PC	(AUV) E1*2007/46*0627*16 bis 20	VW GOLF Sportsvan	1395	92	CZCA	SACCZCAX0	2016	Euro 6b
3	VW Group PC	(5N) E1*2001/116*0450*22 bis 29	VW TIGUAN	1395	92	CZDB	ACCZDBX0	2016	Euro 6b
4	VW Group PC	(2K) E1*2001/116*0252*44 bis 47	VW CADDY	1395	92	CZCB	ACCZCBX0	2016	Euro 6b
5	VW Group PC	(3C) E1*2001/116*0307*45	VW PASSAT	1395	92	CZCA	ACCZCAX0	2016	Euro 6b

Anlage 2 / Annex 2
Prüfbericht Nr. / Test report No.

TÜH XXX
XXX XXX

TÜV Technische Überwachung Hessen GmbH

Automotive

Typ / Type : **TBD**
Hersteller / Manufacturer : **HJS**

Direct Injection VehiclesYYY

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels- bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
6	VW Group PC	(5L) E11*2007/46*0010*24	SKODA YETI	1395	92	CZCA	ACCZCAX0	2016-	EURO 6b
7	VW Group PC	(NH) E11*2007/46*0250*13	SKODA RAPID	1395	92	CZCA	LCZCAF1	2016	EURO 6b
8	VW Group PC	(8X) E1*2007/46*0414*17	AUDI A1 SPORTBACK	1395	92	CZCA	SCZCAF1	2016	EURO 6b
9	VW Group PC	(8V) E1*2007/46*0607*19	AUDI A3 SPORTBACK	1395	92	CZCA	SCZCAF1	2016	EURO 6b
10	VW Group PC	(8V) E1*2007/46*0607*18	AUDI A3 LIMOUSINE	1395	92	CZCA	LCZCAF1	2016-	EURO 6b
11	VW Group PC	(5F) E9*2007/46*0094*17 bis 21	SEAT LEON	1395	92	CZCA	BCZCAX0V	2016-	EURO 6b

Typ / Type : TBD

Hersteller / Manufacturer : HJS

Port Fuel Injection VehiclesYYY

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels-bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
1	Opel	(S-D) e1*2001/116*0379*35 bis 37	CORSA-E	1398	66	B14XER	**DR	2016	Euro 6b
2	Opel	(S-D) e1*2001/116*0379*35 bis 37	CORSA-E	1398	55	B14XER	**DS	2016	Euro 6b
3	Opel	(S-D) e1*2001/116*0379*35 bis 37	CORSA-E	1398	74	B14XER	**DT	2016	Euro 6b
4	Opel	(S-D) e1*2001/116*0379*35 bis 37	ADAM	1398	64	B14XER	**D1	2016	Euro 6b
5	Opel	(B-K) e1*2007/46*0996*06	ASTRA ASTRA+ ASTRA SPORTSTOURER ASTRA SPORTSTOURER+	1399	74	B14XER	** or ***DC	2016	Euro 6b

Typ / Type : TBD

Hersteller / Manufacturer : HJS

Port Fuel Injection VehiclesYYY

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels-bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
6	Opel	(S-D Monocab B) e4*2007/46*0165*13 bis 15	MERIVA	1398	74	B14XER	**DT	2016	Euro 6b
7	Opel	(S-D/VAN) e1*2007/46*0505*11	CORSA-E VAN (N1)	1398	66	B14XER	*DR	2016	Euro 6b
8	Opel	(S-D/VAN) e1*2007/46*0505*11	CORSA-E VAN (N1)	1398	55	B14XER	*DS	2016	Euro 6b

Typ / Type : TBD

Hersteller / Manufacturer : HJS

Direct Injection VehiclesYYY

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels-bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
1	AUTOMOBILES PEUGEOT	(M) E2*2007/46*0534*0 bis 02	PEUGEOT 3008	1598	121		4	2016	Euro 6b
2	AUTOMOBILES PEUGEOT	(0U) E2*2001/116*0377*23	PEUGEOT 3008	1598	121		5GZ U5GZ	2016	Euro 6b
3	AUTOMOBILES PEUGEOT	(8) E2*2007/46*0080*31	PEUGEOT 508	1598	121		D5GZ E5GZ	2016	Euro 6b
4	AUTOMOBILES PEUGEOT	(0) E2*2007/46*0004*20	PEUGEOT 5008	1598	121		E5GZ	2016	Euro 6b
5	AUTOMOBILES PEUGEOT	(C) E2*2007/46*0070*31	PEUGEOT 208	1598	121		A5GZ C5GZ	2016	Euro 6b

Motor 1.6 THP 165

Fehlt noch bzw. untersuchen

Citroen C4 Picasso/Gran Picasso

Citroen DS4

Typ / Type : TBD

Hersteller / Manufacturer : HJS

Port Fuel Injection VehiclesYYY

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels-bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
1	FCA ITALY SPA	(312) e3*2007/46*0064*25, 30, 33	FIAT 500	1242	51	169A4000	AXA1A	2016	Euro 6b
2	FCA ITALY SPA	(312) e3*2007/46*0064*19, 30, 33	FIAT PANDA	1242	51	169A4000	PXA1A	2016	Euro 6b
3	FCA ITALY SPA	(199) e3*2001/116*0217*45, 50	FIAT PUNTO	1242	51	169A4000	BXZ1A	2016	Euro 6b
4	FCA ITALY SPA	(312) e3*2007/46*0064*25, 33	LANCIA YPSILON	1242	51	169A4000	YXA1A	2016	Euro 6b
5	FORD	(RU8) E3*2001/116*0280*10	FORD KA	1242	51	169A4000	ABDA1U	2016	Euro 6b

Typ / Type : TBD

Hersteller / Manufacturer : HJS

Direct Injection VehiclesYYY

Verwendungsbereich des Partikelminderungssystems

Scope of application of particulate reduction system

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.-Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Handels-bezeichnung Brand name	Hubraum V_H Capacity V_H cm³	Nennleistung Normal engine power Kw	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgas- stufe emission class
1	Toyota	(E15UT(A)) e11*2001/116*0116*18 bis 20	AURIS	1197	85	?8NR-FTS?	NRE185	2016	Euro 6b
2	Toyota	(AX1T) e11*2007/46*3641*00	C-HR	1197	85	?8NR-FTS?	NGX10	2016	Euro 6b

8.3.ANNEX 3 LIST OF VEHICLES-ENGINES HJS

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.- Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Injection System	Handelsbezeichnung Brand name	Hubraum VH Capacity VH	Nennleistung Normal engine power	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgasstufe emission class
					[cm³]	[KW]				
1	**VW Group PC**	**(AU) E1*2007/46*0623* 16 bis 21**	**DI**	**VW GOLF**	**1395**	**92**	**CZCA**	**GAC4CZCAX0**	**2016**	**Euro 6b**
2	VW Group PC	(AUV) E1*2007/46*0627*16 bis 20	DI	VW GOLF Sportsvan	1395	92	**CZCA**	SACCZCAX0	2016	Euro 6b
3	VW Group PC	(5N) E1*2001/116*0450*22 bis 29	DI	VW TIGUAN	1395	92	**CZDB**	ACCZDBX0	2016	Euro 6b
4	VW Group PC	(2K) E1*2001/116*0252*44 bis 47	DI	VW CADDY	1395	92	**CZDB**	ACCZCBX0	2016	Euro 6b
5	VW Group PC	(3C) E1*2001/116*0307*45	DI	VW PASSAT	1395	92	**CZCA**	ACCZCAX0	2016	Euro 6b
6	VW Group PC	(5L) E11*2007/46*0010*24	DI	SKODA YETI	1395	92	**CZCA**	ACCZCAX0	2016	Euro 6b
7	VW Group PC	(NH) E11*2007/46*0250*13	DI	SKODA RAPID	1395	92	**CZCA**	LCZCAF1	2016	Euro 6b
8	VW Group PC	(8X) E1*2007/46*0414*17	DI	AUDI A1 SPORTBACK	1395	92	**CZCA**	SCZCAF1	2016	Euro 6b
9	VW Group PC	(8V) E1*2007/46*0607*19	DI	AUDI A3 SPORTBACK	1395	92	**CZCA**	SCZCAF1	2016	Euro 6b
10	VW Group PC	(8V) E1*2007/46*0607*18	DI	AUDI A3 LIMOUSINE	1395	92	**CZCA**	SCZCAF1	2016	Euro 6b
11	VW Group PC	(5F) E9*2007/46*0094*17 bis 21	DI	SEAT LEON	1395	92	**CZCA**	BCZCAX0V	2016	Euro 6b
Lfd--Nr. Fahrzeug No. of vehicle	**Fzg.- Hersteller Vehicle Manufacturer**	**(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.**	**Injection System**	**Handelsbezeichnung Brand name**	**Hubraum VH Capacity VH**	**Nennleistung Normal engine power**	**Motor-Typ engine type code**	**Code Variante code of variants**	**Baujahr von/bis Model year from/to**	**Abgasstufe emission class**
					[cm³]	[KW]				
1	**Opel**	**(S-D) e1*2001/116*0379 *35 bis 37**	**PFI**	**CORSA-E**	**1398**	**66**	**B14XER (L)**	****DR**	**2016**	**Euro 6b**
2	Opel	(S-D) e1*2001/116*0379*35 bis 37	PFI	CORSA-E	1398	55	**B14XER (L)**	**DS	2016	Euro 6b
3	Opel	(S-D) e1*2001/116*0379*35 bis 37	PFI	CORSA-E	1398	74	**B14XER (L)**	**DT	2016	Euro 6b
4	Opel	(S-D) e1*2001/116*0379*35 bis 37	PFI	ADAM	1398	64	**B14XER**	**D1	2016	Euro 6b
5	Opel	(B-K) e1*2007/46*0969*06	PFI	ASTRA	1399	74	**B14XER**	** or ***DC	2016	Euro 6b

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.- Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Injection System	Handelsbezeichnung Brand name	Hubraum VH Capacity VH	Nennleistung Normal engine power	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgasstufe emission class
					[cm³]	[KW]				
1	AUTOMOBILES PEUGEOT	(M) E2*2007/46*0534*0 bis 02	DI	PEUGEOT 3008	1598	121	**EP6FDTM/EP6FDT**	4	2016	Euro 6b
2	**AUTOMOBILES PEUGEOT**	**(0U) E2*2001/116*0377 *23**	**DI**	**PEUGEOT 3008**	**1598**	**121**	**EP6FDT**	**5GZ U5GZ**	**2016**	**Euro 6b**
3	AUTOMOBILES PEUGEOT	(8) E2*2007/46*0080*31	DI	PEUGEOT 508	1598	121	**EP6FDT**	D5GZ E5GZ	2016	Euro 6b
4	AUTOMOBILES PEUGEOT	(0) E2*2007/46*0004*20	DI	PEUGEOT 5008	1598	121	**EP6FDT**	E5GZ	2016	Euro 6b

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.- Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Injection System	Handelsbezeichnung Brand name	Hubraum VH Capacity VH	Nennleistung Normal engine power	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgasstufe emission class
					[cm³]	[KW]				
1	FCA ITALY SPA	**e3*2007/46*318*02**	PFI	**FIAT 500 X -334**	1598	81	**1.6 E-torQ 55263842**	**AXE1A**	2016	Euro 6b
2	FCA ITALY SPA	**e3*2007/46*300*05**	PFI	**Jeep Renegade (BU)**	1598	81	**1.6 E-torQ 55263842**	**AXF1A**	2016	Euro 6b

8.4.ANNEX 4

Lfd--Nr. Fahrzeug No. of vehicle	Fzg.- Hersteller Vehicle Manufacturer	(Fahrzeugtyp) Gen.-Nr. (Vehicle type) Appr.-No.	Injection System	Handels-bezeichnung Brand name	Hubraum VH Capacity VH	Nennleistung Normal engine power	Motor-Typ engine type code	Code Variante code of variants	Baujahr von/bis Model year from/to	Abgasstufe emission class
					[cm³]	[KW]				
1	**VW Group PC**	**(AU) E1*2007/46*0623*16 bis 21**	**DI**	**VW GOLF**	**1395**	**92**	**CZCA**	**GAC4CZCAX0**	**2016**	**Euro 6b**
2	VW Group PC	(AUV) E1*2007/46*0627*16 bis 20	DI	VW GOLF Sportsvan	1395	92	**CZCA**	SACCZCAX0	2016	Euro 6b
4	VW Group PC	(2K) E1*2001/116*0252*44 bis 47	DI	VW CADDY	1395	92	**CZDB**	ACCZCBX0	2016	Euro 6b
5	VW Group PC	(3C) E1*2001/116*0307*45	DI	VW PASSAT	1395	92	**CZCA**	ACCZCAX0	2016	Euro 6b
10	VW Group PC	(8V) E1*2007/46*0607*18	DI	AUDI A3 LIMOUSINE	1395	92	**CZCA**	SCZCAF1	2016	Euro 6b
1	**Opel**	**(S-D) e1*2001/116*0379*35 bis 37**	**PFI**	**CORSA-E**	**1398**	**66**	**B14XER (L)**	****DR**	**2016**	**Euro 6b**
2	Opel	(S-D) e1*2001/116*0379*35 bis 37	PFI	CORSA-E	1398	55	**B14XER (L)**	**DS	2016	Euro 6b
3	Opel	(S-D) e1*2001/116*0379*35 bis 37	PFI	CORSA-E	1398	74	**B14XER (L)**	**DT	2016	Euro 6b
1	AUTOMOBILES PEUGEOT	(M) E2*2007/46*0534*0 bis 02	DI	PEUGEOT 3008	1598	121	**EP6FDTM/EP6FDT**	4	2016	Euro 6b
2	**AUTOMOBILES PEUGEOT**	**(0U) E2*2001/116*0377*23**	**DI**	**PEUGEOT 3008**	**1598**	**121**	**EP6FDT**	**5GZ U5GZ**	**2016**	**Euro 6b**
3	AUTOMOBILES PEUGEOT	(8) E2*2007/46*0080*31	DI	PEUGEOT 508	1598	121	**EP6FDT**	D5GZ E5GZ	2016	Euro 6b
1	**FCA ITALY SPA**	**e3*2007/46*318*02**	**PFI**	**FIAT 500 X -334**	**1598**	**81**	**1.6 E-torQ 55263842**	**AXE1A**	**2016**	**Euro 6b**

18.Juli 2023

8.5.ANNEX 5 REQUEST FOR PARTICIPATION IN THE FIELD TRIAL

Reduktion der Partikelemission von Fahrzeugen mit Benzinmotor

Die EU hat mittlerweile erkannt, dass die Partikelmissionen von Fahrzeugen mit Benzinmotoren, die noch nicht mit einem Partikelfilter ausgerüstet sind, eine zunehmend ins Gewicht fallende Emissionsquelle darstellen. Da diese Fahrzeuge noch viele Jahre in Betrieb sein werden und somit weiterhin nennenswert zur Luftbelastung durch Partikel, speziell in den Innenstädten mit hohem Verkehrsaufkommen, beitragen, ist eine mögliche Massnahme zur Verbesserung der Situation eine Nachrüstung der Fahrzeuge mit geeigneten Filtersystemen.

Die EU-Kommission hat dem schweizerischen VERT-Verein ('VERT'), der bereits in den 90er Jahren die Grundlagen für die weltweite Filternachrüstung von Dieselfahrzeugen erarbeitet hat, den Auftrag für die Entwicklung und Erprobung von preisgünstigen Nachrüstlösungen für die Minderung der Abgas-Partikelemissionen von Benzinmotoren erteilt. Das Projekt läuft in der Zeit von 2022 bis 2025 im Rahmen von HORIZON und heisst AeroSolfd.

Die Kosten der Fahrzeugtests werden komplett von der Schweiz übernommen, die sich damit an diesem wichtigen Projekt beteiligt. Zuständig ist das SBFI, das Staatssekretariat für Bildung, Forschung und Innovation.

Gesucht: Testfahrzeuge

Für die Durchführung dieses Projektes wird eine Flotte von 50 Fahrzeugen eingesetzt. Diese wird aufgeteilt zwischen Deutschland (20 Fahrzeuge), Israel (10) und der Schweiz (20). VERT hat die Aufgabe, vier für den Versuch geeignete Fahrzeugfamilien zu definieren, für welche geeignete Filtersysteme konstruiert und gefertigt werden. Dabei sollen die Nachrüstlösungen kostengünstig und ohne nachteilige Wirkung auf die Motorleistung, den Kraftstoffverbrauch und das Betriebsverhalten der Fahrzeuge sein. Von den Filterlösungen werden Abscheidegrade von mindestens 95% verlangt – wir erwarten 99% und damit wird das Abgas sauberer als die Umgebungsluft.

Für den Dauerversuch über einen Zeitraum von 6 Monaten ('Versuchsdauer') suchen wir Fahrzeughalter, die sich an diesem Projekt beteiligen möchten und im alltäglichen Fahrbetrieb den Nachweis für ein einwandfreies Funktionieren der Filtersysteme erbringen. An den Testfahrzeugen werden die bestehenden Abgasanlagen für diesen Zeitraum durch solche mit integriertem Filter ersetzt. Der Einbau wird durch einen von VERT mandatierten Schweizer Garagenbetrieb ausgeführt und erfordert keine baulichen Änderungen am Fahrzeug. Der Austausch der Abgasanlagen wird 2 Tage in Anspruch nehmen. In dieser Zeit wird dem Halter ein Ersatzfahrzeug zur Verfügung gestellt. Gemäss aktuellem Zeitplan soll Mitte Oktober im 2-Tage-Rhythmus mit dem Umbau der Fahrzeuge begonnen werden. Allfällige Umtriebe und Unannehmlichkeiten durch das Zurverfügungstellen des Fahrzeuges werden pauschal mit Fr. 800.- abgegolten, allfällige Schäden werden von einer Haftpflichtversicherung des Umrüsters übernommen. Das Fahrzeug erhält für diese Zeit eine Sonderzulassung durch das Bundesamt für Strassen ASTRA. Die Fahrzeughalter dürfen während der Versuchsdauer mit dem Testfahrzeug die Schweiz verlassen.

Während der Versuchsdauer wird das Betriebsverhalten der Fahrzeuge durch eingebaute Datenaufzeichnungsgeräte erfasst und automatisch über Funk einer Zentrale übermittelt. Dadurch wird sichergestellt, dass allfällige Anomalien umgehend gemeldet werden und bei Bedarf zeitnah reagiert werden kann. Die Partikelemissionen werden im Verlauf des Tests einmal durch eine einfache Messung im Leerlauf überprüft. Dazu kommt ein VERT-Testingenieur nach vorheriger Absprache direkt zum Fahrzeughalter.

Nach Ablauf des Versuchs wird das Fahrzeug auf Kosten von VERT wieder in den ursprünglichen Zustand versetzt und durch Messung überprüft, dass sich nichts verschlechtert hat. Ferner werden sämtliche persönlichen Daten gelöscht. Die erfassten technischen Daten werden in anonymisierter Form ausschliesslich für wissenschaftliche Zwecke verwendet.

Für den Versuch gesuchte Fahrzeuge

(***Antrieb***: Kein Allrad, ***Getriebeschaltung:*** Manuell oder automatisch)

Hersteller	Typ	Hubraum cm^3	Leistung kW	Baujahr	Emissions-stufe
VW	Golf	1395	92	2016	Euro 6b
VW	Golf Sportsvan	1395	92	2016	Euro 6b
VW	Caddy	1395	92	2016	Euro 6b
VW	Passat	1395	92	2016	Euro 6b
Audi	A3 Limousine	1395	92	2016	Euro 6b
Opel	Corsa-E	1398	66	2016, 2017	Euro 6b
Opel	Corsa-E	1398	55	2016, 2017	Euro 6b
Opel	Corsa-E	1398	74	2016, 2017	Euro 6b
Peugeot	5008	1598	121	2016, 2017	Euro 6b
Peugeot	3008	1598	121	2016, 2017	Euro 6b
Peugeot	508	1598	121	2016, 2017	Euro 6b
Fiat	500 X	1598	81	2016, 2017	Euro 6b
Fiat	Jeep Renegade	1598	81	2016, 2017	Euro6b

An einer Teilnahme am Versuch Interessierte melden sich mit beiliegendem An-meldeformular unter Beilegung einer Kopie des Fahrzeugausweises bei:

Thomas W.Lutz, Brunnenwiese 53, CH-8132 Egg lutz@retired.ethz.ch

Tel.: +41 44 984 32 93 Mobile: +41 78 730 34 55

Der ***VERT-Verein*** steht für ***Verified Emission Reduction Technologies,*** die in der Regel die beste verfügbare Technologie (BVT) zur Minderung von Emissionen und Umweltbelastungen von Verbrennungsmotoren darstellen. Aufgrund der Fachkenntnisse im Bereich der BVT zur Emissionsminderung mit Schwerpunkt bei Partikeln und Stickoxiden sorgt der Verein für den Know-how-Transfer zwischen den Interessengruppen in der Industrie, als Berater für politische Entscheidungsträger und bietet über seine Mitglieder einen Weg zu und zuverlässigen Produkten.

VERT Verein c/o JCA Treuhand AG / Aemetstrasse 3 / CH-8166 Niederweningen

Website: www.vert-dpf.eu

ANMELDUNG eines FAHRZEUGES

für

den Dauerversuch im Rahmen des EU-AeroSolfd-Programms

Fahrzeug: Typ:_____

Baujahr:_____

Kilometerstand:_____

Approximative jährliche km-Leistung: _____

Halter: Name: _____

Vorname:_____

Firma: _____
(Falls es sich um ein Firmenfahrzeug handelt)

Adresse: Strasse:_____

PLZ/Ort: _____

E-Mail:_____

Tel:_____ Mobile: _____

Benützer *): Name:_____

Vorname:_____

Adresse: Strasse:_____

PLZ/Ort: _____

E-Mail:_____

Tel:_____ Mobile: _____

*) Falls nicht mit dem Halter identisch

Der Unterzeichnende verpflichtet sich, das oben erwähnte Fahrzeug unter den aufgeführten Bedingungen für den Dauerversuch zur Verfügung zu stellen. Im Übrigen erklärt sich der Unterzeichnende damit einverstanden, dass die gesammelten Daten für den angegebenen Zweck verwendet werden.

Falls das Fahrzeug für den Dauerversuch eingesetzt wird, werden die gegenseitigen Verpflichtungen vertraglich geregelt.

Ort/Datum:_____ Name: _____

Unterschrift: _____