

# New GPF for Retrofit Gasoline a VERT-HORIZON Project starting now

12<sup>th</sup> VERT Forum

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## VERT activities in Horizon Europe Framework Program

- Horizon Europe Framework Program (HORIZON)
- Call: HORIZON-CL5-2021-D5-01
- Duration (months): 36
- Proposal title: Fast track to cleaner, healthier urban Aerosols by market ready Solutions of retrofit Filtration Devices for tailpipe, brake systems and closed environments
- Activity: HORIZON-CL5-2021-D5-01-15



**The EU strategic Plan, is to contribute**  
“Towards climate-neutral and environmental friendly mobility through clean solutions across all transport modes while increasing global competitiveness of the EU transport sector”



## Why still invest in the combustion engine fleet?

- **Impact of transport** on air and water quality **has been repeatedly found to have high emissions** (e.g. ammonia-fuelled vehicles, high emitters of particulates)
- This **due to tailpipe emissions from older vehicles**, vehicles exceeding emissions limits in real driving conditions, or by vehicles, not being specified to not limits (e.g. secondary emission like PAH, Nitro-PAH, dioxins, furans, NH<sub>3</sub>, N<sub>2</sub>O)
- THE EU commission considers that the current automobile fleet in Europe is **unlikely to be significantly renewed within the next 10 years**
- Transport emission have a **high impact to public health**



## Motivation for gasoline cars retrofit program

- Particle emission of gasoline engines, was heavily underestimated
- Because these particles of <50 nm are invisible, hence high PN but low PM
- No PM/PN reduction was required by legislation and no filters have been implemented before Euro 6d for DI (direct injection)
- VERT research has demonstrated since 2012 the high toxicity of gasoline particles with attached extremely toxic Polycyclic Aromatic Hydrocarbon (PAH)
- VERT developed BAT (best available technology) retrofit solutions 2014-19, which are now ready for large scale implementation

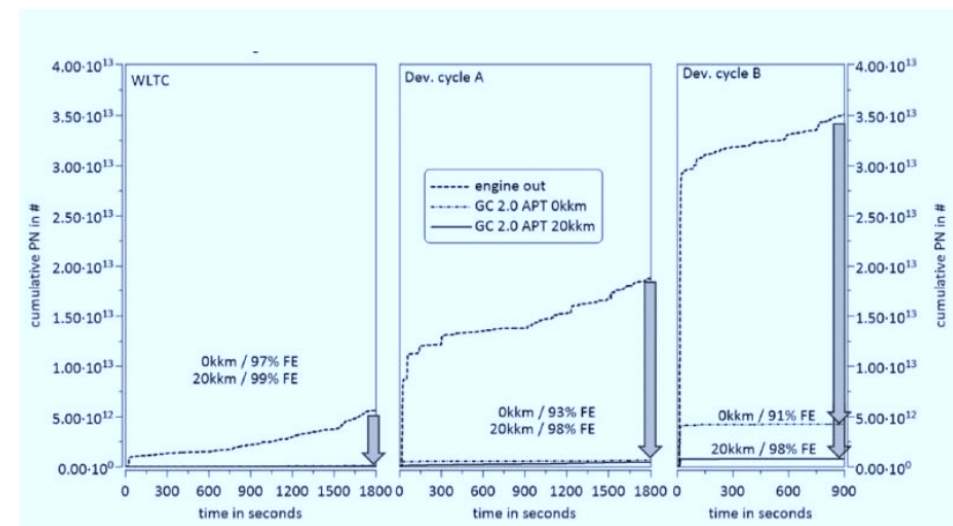
## The project target

- Adapt and demonstrate an affordable high efficient gasoline particle filter
- Capable of reducing 95% of the exhaust particles
- Cost efficient solution in a cost ranging from € 700 to € 1.000 depending on engine size and power rating
- Fast track to market by using an already proven technology in already high volume production
- Exploitation plan for retrofitting 5 million vehicles with the GPF by 2035



## GPF retrofit solution | Substrate

- Second-generation Cordierit wall-flow Gasoline Particle Filter substrates (GPF, CORNING 2.0)
- Improved filtration properties compared to first-generation GPF
- Filtration efficiency of more than 95% in the size range of 10-500 nm
- Effective filtration of 98%

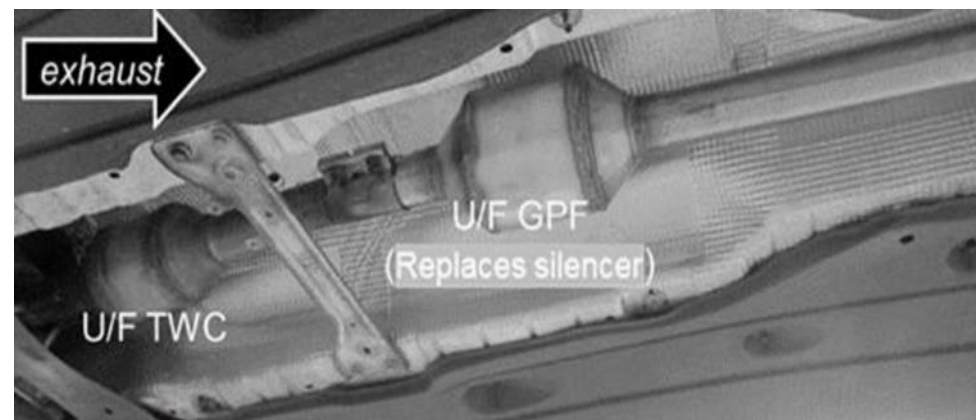


Source: Corning Incorporated



## GPF retrofit solution | System approach

- Integrated into the exhaust part by system engineering with canning, noise isolation, vibration isolation, control of backpressure and temperature
- Low-cost retrofit kits designed, manufactured and installed by VERT member companies.
- Replacing the middle silencer (under floor) of the vehicle
- Improved noise emission
- Homologated solution

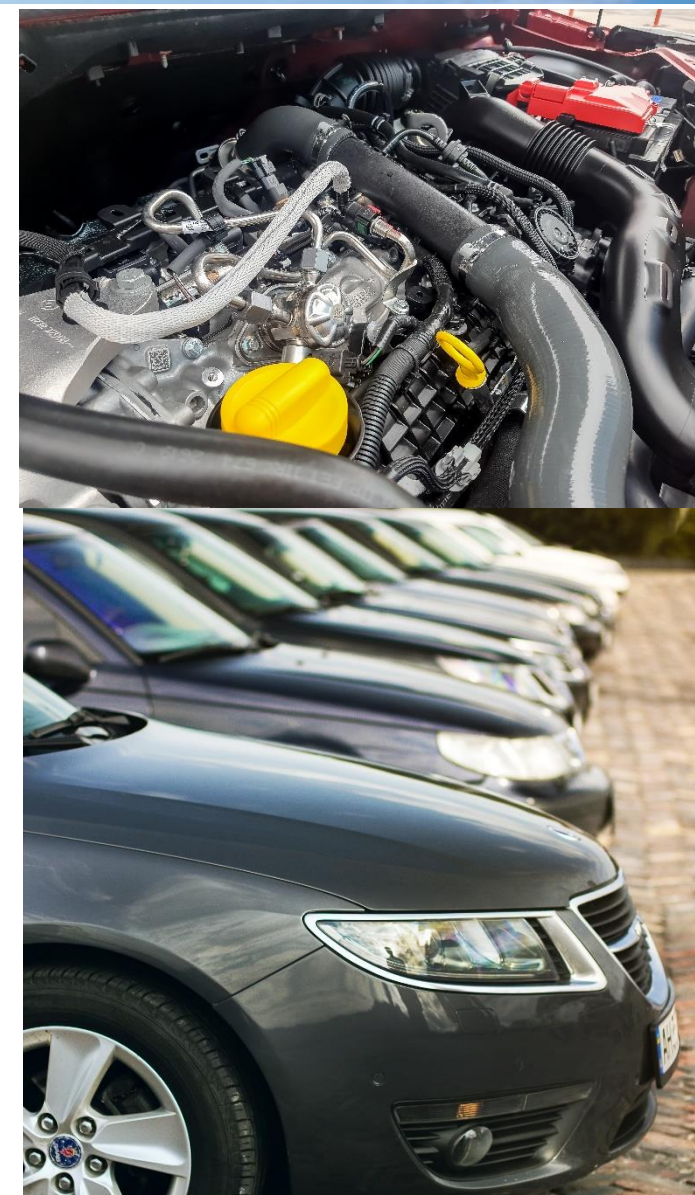


Source: Corning Incorporated



## GPF retrofit solution | Target market

- DI injected engine EURO 6c and before
- Model year from 2016 on
- Target market price (installed) < 10% of the vehicle market price
- Demonstration fleets in Israel, Switzerland and Germany
- High emitter identification by a 1.000 vehicle NPTI check



## Objectives of the VERT program

- Development and demonstration of cost-efficient retrofit solutions for the direct-injected European gasoline fleet
- Match the retrofit solutions to representative gasoline passenger car type families
- Measure secondary emissions (i.e. PAH, Nitro-PAH, NH<sub>3</sub>, N<sub>2</sub>O) to evaluate the impact of the retrofit filter
- Perform field tests monitor the performance of the retrofit filter by usage of the vehicles





## The impact

- Globally 10.2 million people older than 14 years die prematurely only due to traffic-related combustion generated BC nanoparticles per year<sup>1)</sup>, thereof in Europe 1.45 million.
- EU traffic today comprises 1300 million cars
- Every 100 vehicles with retrofitted GPF will save one adult life per year.
- Our goal is to tailpipe-retrofit at least 5 million vehicles post-project (2035)

<sup>1)</sup> Based on latest Harvard's last epidemiologic research data (2021)





## How to get started?

- Proposal have been submitted to the HORIZON-CL5-2021-D5-01 Call by September 2021
- The AeroSofld consortium passed the evaluation phase by January 2022
- Preparation Phase until May/June 2022
- Expected Start of project May 2022





Thank you very much for your attention

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