

FBC DOSING

Fuel Borne Catalysts (Additives) for DPF Regeneration **Specification and Testing Procedure** **for VERT Certification**

1. Specification

Objective for automatic FBC dosing

- If fuel additives are used to support regeneration, the active ingredient must be dosed fully automatically into the fuel at a concentration adapted to the application.
- System interventions are permissible during periodic maintenance, errors must be detected and reported by the electronic filter control.
- In the event of filter damage, further additive addition must be automatically stopped immediately.

Regulations of Authorities

- In Switzerland, only those fuel additives may be used to support the regeneration of particle filter systems which are registered with FOEN in accordance with the Ordinance on Substances and with FOPH and which have successfully passed the VERT secondary emission test VSET.
- The concentration is limited by the maximum concentration tested in the VERT certification tests.
- Additives may only be used in conjunction with particle filter systems that have successfully passed the VFT1, VFT2 and VFT3 test with these additives. This restriction must be recognizable in the imprint on the additive containers.

Method and Accuracy of Dosing Additives

- Correct additive dosing must be guaranteed under all operating conditions.
- Additivation can be continuous or discontinuous.
- In the case of discontinuous additive dosing in connection with the refuelling process, it may be required that the vehicle is stationary in the horizontal position and that the ignition is switched off.
- The concentration must be adaptable to the application, whereby it may be required that the concentration is set exclusively by the responsible retrofitter.
- The concentration of the additive in the fuel must be within 15% of the setpoint value over the entire service life, irrespective of the amount of fuel used.

Safety Aspects

- Printing on the additive storage tank must indicate which additive in which concentration is permitted for use in the corresponding plant.
- The use of spill-proof filler with integrated gas recirculation prevents the additive liquid **and** its vapours from escaping into the atmosphere.
- The use of additives must not lead to additional fire or explosion risks - neither during refuelling nor during operation.
- The additive safety data sheet and the operating instructions must be handed over to the operator.

Automatic Control Functions / Error Messages

- When a minimum level of 20 % is reached in the additive storage tank, the machine operator must be informed by an acoustic and an optical signal.
- This alarm may only be extinguished after conscious acknowledgement.
- The time reaching the minimum level in the storage tank is stored in the real-time memory of the electronic filter control and output alphanumerically with the other error messages.

Design Specifications

- The design, installation and operation of the additive dosing system must not interfere with the normal operation or the usual maintenance work, nor must safety aspects be affected.
- The entire system must be free of liquid leaks.
- Evaporation losses from the storage tank are not permitted. The tank must be tightly closed or connected to the atmosphere by a ventilation valve.

Operating Conditions

- Ambient temperature: -20°C to +50°C
- Vibration level at installation location: 10 g at natural frequency
- Operational safety up to 30° inclination of the machine in any direction

Additive Reserve in Storage Tank

For at least one working week

Useful Life

The service life of the dosing system must correspond to the service life of the particle filter system.

Maintenance

The maintenance interval of the dosing system should correspond to the maintenance interval of the filter system.

Operating Instructions, Assembly Instructions and Imprint

- Operating instructions including detailed assembly instructions in 4 languages: D / F / E / I
- Safety data sheet for the additive in 4 languages: D / F / E / I
- Imprints in English or by customer agreement

Installation Space, Costs, scope of delivery, measurement data displays, plug connections:
No specifications

Warranty

- at least 2 years
- The manufacturers of the additives are fully liable for engine damage caused by the proper use of fuel additives (not the filter system manufacturers or the additive dosing system manufacturers). A corresponding binding obligation must be given to the operator as part of the operating instructions.

2. VERT Certification Testing

Test Centre

The testing laboratory must be VERT accredited to carry out the VERT certification tests (filter list Appendix 3).

VERT-Testing: The FBC must be used throughout all VERT tests VFT1, VFT2, VSET and VFT3 with the respective filter system and dosing control unit and operation will only be permitted in this combination.

Conformity within the Scope of VFT1

On the basis of the documentation submitted by the manufacturer, conformity with the specifications is checked.

Endurance Test VFT2

During the testing of the filter system in operational use (>2000 operating hours), the filter system is inspected by the testing laboratory at least twice on site and samples are taken from the fuel and analysed. At the same time, the two alarm situations (filter damage and empty storage tank) are simulated and the error messages are checked.

Control Test after Endurance Test VFT3

The manufacturer provides the test laboratory with the complete data download from the field operation with comments. The additive dosing unit is checked by visual inspection and a final concentration control of the fuel is performed.

Test Report

The test documents are an integral part of the VERT test reports VFT1, VFT2, VFT3 and VSET for all filter systems regenerated with additives.

Abbreviations

FOEN	Swiss Federal Office for the Environment (BAFU)
FOPH	Swiss Federal Office for Public Health (BAG)
FBC	Fuel Borne Catalyst = catalytically active fuel additive
DPF	Diesel Particle Filter
VERT	Association for the Verification of Emission Reduction Technology
VFT	Vert Filter Test
VSET	VERT Secondary Emissions Test

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The VERT-Association offers on its website information about particle filter retrofitting. In addition, a comprehensive database with already retrofitted vehicles and machines is created there. The VERT filter list provides information on which filter systems are certified and which manufacturers can supply them.

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