

# PURIFILTER™

## for diesel engines

***Purifilter™** from Engine Control Systems (ECS) is an integrated diesel particulate filter and silencer, which efficiently removes particulate (PM) and gaseous pollutants, carbon monoxide, CO, and hydrocarbons, HC. The filtered particles (soot) are automatically burnt off (self regeneration) at exhaust temperatures above 320 ° C.*

***Purifilter™** is a self regenerating particulate filter system based on Silicon Carbide (SiC), which offers superior thermal durability and extended service life. The advanced base and precious metal catalyst system not only lowers the balance point of the soot but also provides an extremely high reduction of CO and HC.*



### FUNCTION

When the exhaust passes through the micro-porous filter walls the soot particles in the exhaust are separated and collected. At the same time the catalytic coating oxidizes the gaseous pollutants of hydrocarbon (HC) and carbon monoxide (CO) to harmless carbon dioxide and water. The catalytic coating also lowers the ignition temperature of the soot to approx. 320° C and the collected soot is automatically burnt off during operation. At operating temperature less than 320° C the filter can be equipped with an electrical heater to regularly burn off the collected soot.

The filtration is so efficient that any debris passing through the engine combustion chamber will also be collected (i.e. lube-oil ash, wear metals, intake air debris etc.). This debris should be removed to prevent excessive build-up. The cleaning intervals will depend on the conditions of the engine and operation conditions.

## APPLICATION

The Purifilter™ is intended for permanent installation on vehicles and machines in heavy operation running regularly with exhaust temperatures above 320° C. At lower temperatures the separated particles will be stored in the filter and increase backpressure. Idle periods should be kept to a minimum.

Exhaust temperature is dependent on a number of variables such as duty cycle, soot composition, make of engine etc. If a vehicles' duty cycle is in question, data logging will be performed to ensure the Purifilter™ will regenerate during the vehicles' current and normal operation.

To log data, a thermocouple is fitted within the exhaust stream, at the position where the Purifilter™ would be installed. This thermocouple is then connected to a small data storage device and the vehicle is returned to normal duty. Typical data logging is 3-5 working days. ECS can supply the data logger which should be returned after use. The data will be analysed by ECS, and the suitability of the duty cycle will be reported.

If exhaust temperatures are too low for passive regeneration the Purifilter can be equipped with heating elements in the inlet section, Purifilter™ Plus, and regeneration can take place at times suitable for the application.

*Under certain conditions the catalytic coating can increase the NO2 value slightly. This is mainly a problem in confined spaces such as mines and tunnels with limited ventilation. For these applications we recommend either the ECS Cattrap or the Unikat Combifilter.*

*ECS recommends the use of Ultra-Low-Sulphur Diesel (max 50 ppm). Fuel containing higher levels of sulphur will reduce efficiency and shorten the maintenance intervals.*

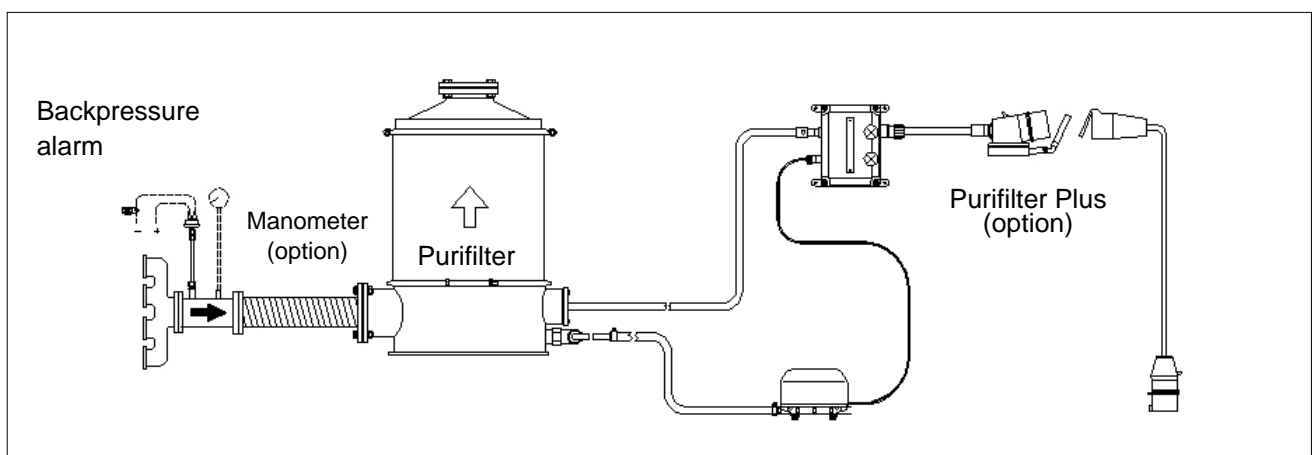
## DESCRIPTION

**The system consists of:**

- A Purifilter™ which is mounted in the exhaust system in place of the original silencer.
- An indicator lamp, which is mounted in the driver's cab to warn of high backpressure.

### Options

- A manometer which continuously monitors the backpressure.
- A precatalyst lowering the ignition temperature to 280-300° C.
- Purifilter™ Plus. Electrical heaters inbuilt in the inlet section for regular regeneration of the filter on the vehicle. Electrical cables and control box are supplied.
- A Combiclean™ station for regular maintenance and cleaning of the filter.



## DESIGN

The Purifilter™ housing is manufactured of stainless steel and consists of an inlet section, a filter section, and an outlet section. The sections are assembled with quick-release clamps that allow easy dismantling for inspection and service. The choice of inlet and outlet sections depends on the installation. The filter part is sized according to the exhaust volume from the engine. The inlet and outlet sections are of the same design as is used for ECS' wellknown Unikat COMBIFILTER, see specification below.

## INLET AND OUTLET SECTIONS FOR PURIFILTER

The choice of inlet and outlet sections depends on the installation of the vehicle. All inlet sections incorporate mounting plates for vertical installation. The inlet and outlet sections can be supplied with brackets for horizontal installation on request.

When ordering, please inform us whether you prefer a vertical or horizontal installation and if the inlet section should be equipped with electrical heaters (Purifilter Plus), see options.

### Inlet section

Inlet section with bottom inlet (axial)

Inlet section with side inlet (radial)

### Outlet section

Typ T2 Outlet section with top outlet (axial)

Typ T7 Outlet section with side outlet (radial)

## PRODUCT SIZING

### Dimensions

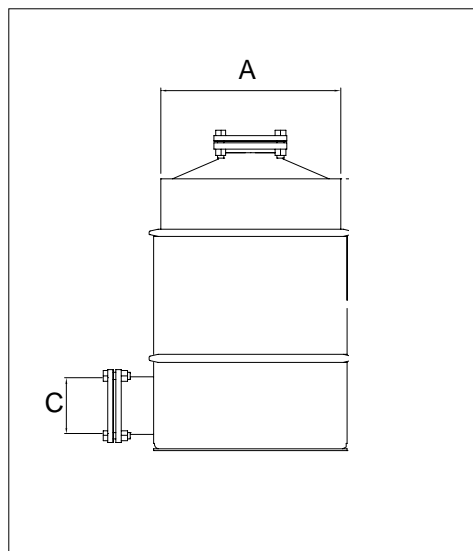
To obtain the proper filter size, the engine make, maximum allowed backpressure and driving conditions must be known. The chart below shows the recommended air intake flow for each filter size. If you do not have the actual OEM intake air flow, use the general equation below to determine the approximate value for four-stroke engines.

$$\text{Engine intake air flow (m}^3\text{/h)} = \frac{\text{Engine displacement (liters)} \times \text{max RPM of engine} \times \text{VE} \times 60}{2000}$$

VE = 0,85 for normally aspirated engines (NA), 1,7 for turbocharged (TA), 2,0 for turbocharged and aftercooled

Please contact Engine Control Systems or your local distributor for further sizing information.

Intake air flow m <sup>3</sup> /h	Max. cylinder volume		Model	Weight kg	A mm	C ø mm
	NA	TA				
125	2,5		SC02H	18		
250	4,5	2	SC04H	22	225	70
350	6,5	2,5	SC06H	24	275	70
650	11	5	SC13H	29	275	100
1000		7	SC20H	39	350	100
1300		10	SC28H	46	380	100
1600		14	SC34H	70	406	130
2200		16	SC43H	75	406	140



## REDUCTION

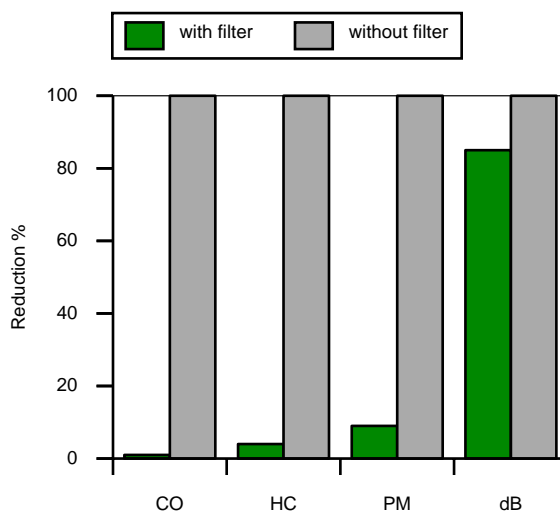
The Purifilter™ effectively removes particulate (PM) and gaseous pollutants CO and HC from diesel exhaust and is also a silencer.

Typical reduction\*:

- Carbon monoxide (CO) 99 %
- Hydrocarbons (HC) 96 %
- Particulate (PM) 91 %
- Silencing > 15 dB

\* Tested according to ISO 8178.

Purifilter™ has been tested by Svensk Bilprovning, Motor-testcenter, Sweden, Leyland Technical Centre and Millbrook Proving Ground, UK, South West Research Institute, USA, and Environment Canada. We are happy to furnish more details of these tests if required.



## WARRANTY

Engine Control Systems' products are warranted for workmanship and defects of material for a period of 12 months or maximum 2000 operation hours. The obligation of this warranty is limited to the replacement of the product. The provisions of this warranty do not apply to the product incorrectly chosen, or installed or operated, nor to any product that has been subjected to damage or negligence. Engine Control Systems shall not be liable for any incidental or consequential damages or for breach of any express or implied warranty.

For further service or for information on our other products, please contact ECS or our distributors.

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