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Reg. No. 2009/038187/23 ▪ VAT No. 4920104116

John Ratcliffe Purifier

A diesel purifier starts to work at an exhaust temperature of around 120° C – thereafter its efficiency rises very quickly. At 230 °C, it removes over 80% of carbons; at 300° C, over 90% of carbon monoxide and over 80% of hydrocarbons, until at 350° C efficiency levels out, with the Purifier eliminating over 90% of both pollutants.
As a truck shifts heavier loads, the more pollution it produces. With a Purifier fitted, the greater the load, the more pollution is reduced. For example, at 1400 rev/min and full load, a typical diesel-powered fork-lift truck produces nearly 3000ppm of carbon monoxide; the Purifier reduces this to around 270ppm - a reduction of over 90%.

1. **High reduction of carbon monoxide to reduce problems of dizziness and headaches which affects the concentration of the operator.**
2. **Effective conversion of hydrocarbons and aldehydes. This translates to less eye irritation. The diesel odours are virtually eliminated.**

The Design

Purifiers are available in more than 400 different configurations to suit virtually every fork-lift truck and bus on the market. In the unlikely event that a standard purifier won't fit, we'll be happy to quote on a once-off model. Whatever shape the purifier takes, the design principles are essentially the same. Each purifier consists substantially of a high-quality grade stainless steel case containing a ceramic honeycomb.
This honeycomb supports a platinum-based catalyst that reacts with pollutants to form carbon dioxide and water as follows:

- (Carbon Monoxide) $2CO + O_2 \rightarrow 2CO_2$ converted to harmless
- (Aldehydes) $HCHO + O_2 \rightarrow CO_2 + H_2O$ converted to harmless
- (Hydrocarbons) $4HC + 5O_2 \rightarrow 4CO_2 + 2H_2O$ converted to harmless

It is at this point that high-technology research and development goes into each purifier model. For the optimum conversion of gases to occur, the maximum surface area of the catalyst has to come into contact with the maximum volume of exhaust gas. Yet the gas must not be blocked by the catalyst support in any significant way, otherwise engine efficiency will be impaired.
Hence the honeycomb design, which creates a turbulent gas-flow to force the maximum amount of gas into contact with the catalyst. The cross-section of each cell in the honeycomb is made to particularly fine tolerances – a delicate balance between optimum cell size (to allow the gas to flow freely) and catalyst surface area (to allow the gas to react easily).
Each model is made to particularly heavy-duty specifications, and is resistant to vibration. Each model is also compact to fit into small engine compartments and should not interfere with normal engine maintenance.

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Diesel Particulate Matter (DPM) (Black Smoke)

(DPM) is the most apparent and troublesome of all diesel emissions. DPM, as defined by most regulations and sampling procedures worldwide, is a complex aggregate of solid and liquid material. Its origin is carbonaceous particulates generated in the engine cylinder during combustion which subsequently combine with several other exhaust components.

DPM is divided into three fractions:

- Carbon – dry carbon particles, commonly known as soot.
- Soluble Organic Fraction (SOF) – heavy hydrocarbons absorbed and condensed on the carbon particles.
- Sulphate – hydrated sulphuric acid.

DPM, because of its sub-micron particle size, is almost totally respirable. It is known to increase the risk of heart and respiratory diseases and has been classified by several government agencies as "human carcinogen" or "probable human carcinogen". DPM has been identified as a Toxic Air Contaminant (TAC).

Kind regards

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