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Crowcon Technical Note

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Subject: **Diesel Fuel: Flammable Vapour & Exhaust Detection**

Diesel Fuel: Flammable Vapour Detection

Flammable liquids generally have a low flash point. This is the temperature above which vapour is given off at sufficient rate to form an explosive mixture with air. Liquids with flash points below normal ambient temperatures automatically release vapour in sufficient volume to provide an explosive mixture; thus, leakage of such liquids is potentially as dangerous as a flammable gas leak

Diesel vapours are impractical to detect using conventional gas detectors due to the very high Flashpoint of the fuel: (52°C to 56°C). Below this temperature in normal ambient conditions there is insufficient vapour emitted for detection (or to present a significant ignition risk). Pellistor-type sensors or infrared detectors will not be able to detect diesel vapours below the flashpoint temperature.

PID (Photo Ionization Detection) sensor technology is used to detect hundreds of Volatile Organic Compounds (including diesel) in the sub-1000ppm level. There is however a risk of potential false alarms where there are small levels of diesel leakage/spillage, or from the presence of other compounds. PID sensors will provide a warning of the presence of low levels of diesel vapours, however they cannot indicate if concentrations are approaching flammable thresholds.

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Diesel Fuel: Exhaust Detection

Highly toxic gases are emitted from processes where fossil fuels are burned (eg vehicle exhausts). The most significant risk from petrol engine exhaust gases is from carbon monoxide (CO): a colourless, odourless gas. Diesel (gasoil) engines emit significantly higher proportions of NOx, although CO is also present in dangerous concentrations.

Nitric oxide (NO or nitrogen monoxide) and nitrogen dioxide (NO2) are the constituents of NOx. At the point of exhaust, nitric oxide accounts for the majority of NOx. However it reacts spontaneously with oxygen in the open atmosphere to produce nitrogen dioxide (NO_2). Nitric oxide is a colourless gas but nitrogen dioxide is an acid, pungent smelling, brown gas.

CO, and NO_2 detectors fitted with electrochemical sensors are typically fitted in environments where vehicle exhaust gases are likely to accumulate.

Alarms should be set in low-ppm (part-per-million) concentrations to protect against toxic risk. Guidance for toxic alarm settings can be found (UK) Health and Safety Executive document EH40 (https://www.hse.gov.uk/pubns/books/eh40.htm).

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