

Evaluation Of Direct Reading Instruments For the Measurement Of Metal Working Fluid Mist

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KEY MESSAGES

- Research undertaken for the UK Lubricant Association (UKLA) identified a number of affordable Direct Reading Aerosol Monitors (DRAMs) that can be used to monitor Metal Working Fluid (MWF) mist.
- In a standardised environmental chamber, nine different DRAMs were tested by generating a linear increase in the concentration of a water-based MWF mist. Of the nine different DRAMs tested most of these responded linearly to the increasing concentration of mist compared to a reference DRAM.
- The sensitivity response of the different instruments varied but none provided an absolute measurement of MWF mist concentration.
- Absolute measurement using DRAMs would require their calibration based on a standardised reference method.
- Two of the DRAMs, the Alphasense and Dylos (both optical particle counters) were subsequently removed from this evaluation process as their performance was inaccurate at high MWF mist concentrations.
- The cost of the different DRAMs used in the research ranged from ~£300 to £4000. One of the high cost instruments the Microdust Pro (Casella Ltd) performed the best.
- Amongst the lower cost instruments, the PATS+ instrument (Berkely Air) had the highest score for instrument performance and usability.
- None of the instruments developed faults whilst subjected to clean and contaminated MWF. However, some of these DRAMs were not as sensitive as others, or were more difficult to use from the operators perspective.

RECOMMENDATIONS

- UKLA to share this evidence with other organisations using DRAMS to identify what additional research may be required before the use of these devices can be recommended to duty holders.
- To consider how an evaluation of DRAMs in a machine workshop can be undertaken to compare the higher cost Microdust Pro (Casella Ltd) with the inexpensive PATS+ (Berkely Air) device.
- To develop good practice standards for using DRAMs to monitor MWF mist and to inform actions taken to control mist emissions.
- It will be necessary to further assess the performance of the most suitable DRAMs with mist generated from contaminated MWF from cutting machine sumps as well as MWF at different working concentrations.

Disclaimer:

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