



## Diesel Particulate Matter (DPM)



Diesel Particulate Matter (DPM) is a known occupational hazard to workers operating diesel-powered equipment. DPM refers to the fine carbon particles or “soot” in diesel exhaust that can penetrate deep into the lungs and be absorbed into the body, posing serious health risks.

Exposure to DPM has been linked with various acute short-term symptoms such as headaches, nausea, coughing, difficult or laboured breathing and also irritation of the eyes, nose and throat. Long-term exposure can lead to chronic, more serious health problems such as cardiovascular disease and cardiopulmonary disease.

In 1998 the National Institute of Occupational Safety and Health (NIOSH) in the USA suggested a link between occupational exposure to diesel particulate and lung cancer. After a number of epidemiological studies, in 2012 the International Agency for Research on Cancer (IARC) (part of the World Health Organisation) classified diesel engine exhaust as Carcinogenic to Humans (Group 1).

Not only hazardous in itself, DPM can also act as a carrier for potentially harmful organic components. Diesel Particulate Matter comprises of elemental carbon (pure carbon), organic carbon (hydrocarbons including PAH's) and trace elements (nitrates, sulphates, etc).



### EXPOSURE STANDARD

While there is no national standard, the currently accepted time weighted average exposure limit is **0.1 mg/m<sup>3</sup> of elemental carbon**.

This is based on guidance from the Australian Institute of Occupational Hygienists (AIOH).<sup>1</sup>

**For further information, contact our team at MPL Laboratories today!**



Accreditation Number 2901

## Sampling Cassettes

Depending on the level of dust and other forms of carbon present (e.g. coal mine) in the environment being sampled there are different sample cassette options available:

SKC 225-317 – this is a precision jewelled impactor cassette that screens out all particles greater than 1.0 µm thereby differentiating DPM from other respirable dust which may also contain elemental carbon (e.g. coal dust).

SKC 225-401 (or equivalent) – this 3-piece styrene cassette (loaded with a quartz filter) may be used with a standard holder and GS-1 cyclone in environments that are not highly dusty and are unlikely to have other forms of carbon present. Therefore, these cassettes are unsuitable for use in underground or coal mines.



## Analysis of Diesel Particulates

In 2007, our laboratory in Perth, MPL Laboratories became the first laboratory in Australia to gain **NATA Accreditation** for the analysis of diesel particulates, as elemental carbon in accordance with NIOSH 5040.

The method requires analysis using a thermo-optical analyser, whereby a portion of the filter is sub-sampled and placed in the instrument oven under an inert atmosphere.

The instrument then ramps the oven temperature to thermally desorb the sample before switching to an oxidizing mode to combust elemental carbon.

Laser light transmission is used to distinguish between organic and elemental carbon, which is detected and quantified via flame ionization detector.

MPL laboratories reports elemental carbon as µg/filter.



## Why Use Envirolab for Your Mining & Construction Projects?

As a leading laboratory in scientific testing, we are qualified and accredited to provide you with absolute results at a rapid turnaround for more informed decisions. That's why we continue to be a first choice for work health testing inspectors, mining operators, engineering contractors and a variety of government agencies that require an expert analysis of diesel particulates.

Our variety of expert services can be tailored to your needs where testing can be provided individually or as a full project.

Most of all, you are supported by an expert team who have many years of knowledge and experience. Through our expertise, we can help you implement suitable monitoring systems, which will in turn facilitate the efficiency and effectiveness of your project management.

To find out more about testing and the best solution for your company, contact us today!



## What is NATA Accreditation?

The National Association of Testing Authorities (NATA) is the authority that provides independent assurance of technical competence through a proven network of best practice industry experts for customers who require confidence in the delivery of their products and services.

**NATA Accreditation** means we have independent recognition and backing by an external regulator that the quality of our results are of the highest standard nationally.

As a leading laboratory, we are fully accredited and qualified for the analysis of diesel particulates, as elemental carbon in accordance with NIOSH 5040.

With **NATA Accreditation**, you have the confidence that you are teaming with a partner that will provide you with absolute results. Contact us today to find out more.



Accreditation Number 2901

### References

- 1 Australian Institute of Occupational Hygienists – DPM Position Paper (09.07.2013)
- 2 NIOSH Method 5040: DIESEL PARTICULATE MATTER (As Elemental Carbon) from NIOSH Manual of Analytical Methods (NMAM), Fourth Edition

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