

DustScan

Dust Monitoring and Dust Consultancy Services

Guidance Note No. 2: Using the DustScan directional dust gauge

This guidance note sets out the methodology behind DustScan directional dust monitoring. It describes the DustScan directional dust monitoring methodology: how, and why, it works; what the results are and what they mean; and where and how to use the gauges.

The directional dust gauge is the principal component of DustScan dust monitoring equipment. DustScan is a 'passive' method that does not need a power supply. It samples all sizes of ambient dust and is ideal for nuisance dust monitoring. The directional gauge can be used in any location where dust movement occurs and can help to detect dust pathways and potential nuisance. Directional gauges are used at quarries, landfills, opencast coal sites, demolition and construction sites, remediation works, materials stockpiles and recycling plants.

DustScan gauges are discreet and unobtrusive, and are easy to install and operate. They can be installed and used by most site staff after basic training.



The photos above show the wide range of sites where our gauges can be used

DustScan directional gauges use a special adhesive dust collection slide ('sticky pad') which is mounted on a replaceable cylindrical monitoring head. The monitoring head fits onto a 2-metre stand. An alignment peg is provided as the gauge must be aligned to north when it is first installed. An alignment tool can be supplied to facilitate orientation. Correct alignment ensures repeatable dust sampling each time the dust monitoring heads are changed. The monitoring head collects fugitive dust coming from 360° around the gauge.

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Once the protective layer is removed the dust monitoring head samples continuously whilst exposed. It is normally left to sample for 1 to 2 weeks. At the end of the sampling period, the head is removed and placed in the protective carrying flask and a replacement head fitted. Used sampling heads are sent to the DustScan offices for computer analysis in the transport boxes provided.

For guidance on the DustDisc dust settlement gauge, the DS100-F combined Frisbee deposition and directional dust gauge and the DS500 combined PM₁₀ and directional dust gauge, please refer to other Briefing Notes in this series.

What is the DustScan directional dust gauge?

The DustScan directional dust gauge measures the nuisance effect caused by dust in flux. Dust in flux is particulate matter that is suspended in an airstream on a pathway between its source and its potential receptors. In contrast, settlement gauges such as the DustDisc and the Frisbee deposition gauge measure dust deposition. Deposited dust has settled out of an airstream – wherever it is measured. Consequently dust in flux and deposited dust are not necessarily the 'same' dust.

How does the DustScan directional gauge work?

DustScan is a 'passive' monitoring method, so it does not require a power supply. With the directional gauge, dust in flux impacts onto the exposed adhesive surface of the sampling cylinder for subsequent computer analysis by us. The sampling cylinder fits onto a monitoring head which is set to north when the gauge is installed, for repeatable directional sampling.

We recommend sampling intervals of 1 - 2 weeks. At the end of each sampling interval the cylinder and sample are sent back to us in the protective container provided. We seal the sample, scan it and measure the directional dusting on it using DustScan software.

Why use the DustScan directional dust gauge?

The directional gauge is ideal for monitoring both dust propagation and dust pathways. Potentially dusty activities on, or off, a site may lead to dust propagation. Dust pathways are also significant on site boundaries, as this is where dust leaving a site may lead to possible nuisance at an off-site receptor. Well-positioned DustScan gauges can help identify the location of dust sources and pathways on and off a site.

The DustScan directional dust gauge can be used to assess the direction, magnitude, and significance of dust pathways and the likelihood of complaint due to dust.

The directional information from DustScan monitoring can be used to identify and quantify sources of dust from various site activities. This can be used to evaluate the effectiveness of mitigation measures and assist site environmental management.

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What do the DustScan results mean?

Directional dust levels are reported as Absolute Area Coverage (AAC%) - the dust coverage irrespective of colour; and Effective Area Coverage (EAC%) - the soiling caused by that dust.

AAC% measures dusting irrespective of colour so all dust, dark or light, contributes to AAC%. Therefore it is an excellent method to identify and discriminate between dust sources – for example there may be more than one in a locality, such as an on-site process and off-site activities. Different AAC% levels from different directions can indicate the scale of these activities.

EAC% is used to measure the potential nuisance caused by dust soiling. As it relates to the darkness of dust, dark-coloured dusts such as coal will have a proportionately greater EAC% for any mass than light-coloured dusts, such as chalk. EAC% measures the likelihood of nuisance caused by dust soiling.

Nuisance criteria have been developed for use with these measures – please refer to Guidance Note No. 3 'Directional Dust Data Assessment'.

Where should DustScan directional dust gauges be used?

DustScan directional gauges are typically installed on site boundaries and should be well away from obstructions such as buildings, tall trees or overhanging vegetation. As with all flux-monitoring systems, there should be a clear air flow to the monitoring head.

The directional gauge must be securely fixed in a vertical position and is normally installed so that the protective rain guard is 2 metres from ground level. A rigid stand is supplied to enable fixing at the correct height – please refer to our installation instructions for more information.

How should DustScan directional dust gauges be used?

DustScan gauges can be used in a range of monitoring applications:

- During baseline studies to establish dust levels before a process, such as a quarry extension, takes place
- As part of an environmental monitoring strategy during the lifetime of a project
- In one-off monitoring programmes such as remediation works, demolition, blasting, etc

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Boundary monitoring typically requires 4 gauges. Larger sites may need one or two more, and some sites need less. The number required depends on the level of information required and the size and complexity of the site. Please contact us to discuss your requirements.

- One DustScan gauge could be used to monitor dust near a single 'point source' such as a stockpile
- Two gauges could be used to monitor dust transit across a site – for example upwind and downwind
- Three or more gauges are required for boundary monitoring

DustScan can be used in conjunction with other monitoring methods. We have experience in other methods and can advise their suitability as required.

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