

WHITE PAPER

Gravimetric and real-time personal particulate monitoring. How to use both for better exposure control.

A practical comparison of measurement principles, compliance roles, limitations and applications, and how real-time visibility can support formal workplace exposure assessment.

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Executive summary

Airborne dust is one of the most consequential and least visible hazards in industrial workplaces. Respirable dust, respirable crystalline silica and welding fume are associated with serious and often irreversible occupational disease, and European and international frameworks therefore oblige employers to assess and control inhalation exposure to hazardous substances.

Two families of measurement methods dominate this task. Gravimetric filter sampling is the long-established reference: it draws a known volume of workplace air through a size-selective sampler and a weighed filter and yields an integrated mass concentration that can be compared against an occupational exposure limit. Optical real-time monitoring uses light scattering to estimate concentration continuously, producing a time series rather than a single post-laboratory value.

These methods are frequently presented as competitors. They are not. They answer fundamentally different questions. Gravimetric sampling answers “Is the workplace compliant, over a defined period, by a recognised procedure?” Real-time monitoring answers “What happened during the task, and when, and are the controls actually working today?” Each has strengths the other cannot provide, and limitations the other compensates for.

The central argument of this white paper is that gravimetric and optical monitoring should be used together. Gravimetric sampling establishes the formal, defensible reference value required for compliance under EN 689 and national occupational exposure limits. Optical real-time monitoring explains how that exposure developed, identifies which tasks drive it, verifies that controls perform under routine conditions, and gives workers immediate feedback. Combined, they deliver both regulatory evidence and operational insight from a single exposure picture.

Dustlight is a wearable optical dust monitor designed to fill exactly this complementary role, not to replace prescribed reference methods, but to add the temporal context, task attribution and real-time visibility that filter-based sampling structurally cannot provide.

Introduction: measuring what workers breathe

Before comparing the two measurement approaches, it helps to establish the common ground they share: the health basis for measuring dust, the regulatory obligation to do so, and the core concepts - the respirable fraction, the time-weighted average and the short-term exposure limit - against which both methods are ultimately judged.

Why dust exposure is regulated

Not all airborne particles reach the parts of the respiratory system where they cause the most harm. The particles that penetrate deep into the gas-exchange region of the lung, the respirable fraction, are of particular concern, because materials such as crystalline silica, hardwood dust and metal-bearing welding fume can cause chronic, progressive and sometimes fatal disease long after exposure. Because the damage is cumulative and largely irreversible, prevention depends on knowing how much of the harmful fraction workers actually inhale.

The regulatory framework: a European starting point

In the European Union, the assessment of inhalation exposure rests on a coherent set of standards that any measurement method, gravimetric or optical, must ultimately be interpreted against:

- **EN 481** defines the inhalable, thoracic and respirable size fractions used for health-related aerosol sampling, the sampling conventions that determine which particles a method is meant to capture. (ISO 7708 defines the same fractions internationally.)
- **EN 482** sets the general performance requirements that procedures for measuring chemical agents in workplace air must meet accuracy, uncertainty and validation criteria.
- **EN 689** defines the strategy for comparing measured inhalation exposure with occupational exposure limit values, i.e. how measurement results are used to demonstrate compliance.

These European standards are applied through national occupational exposure limits and rules: in Germany through the TRGS series and the general dust limit (Allgemeiner Staubgrenzwert), in the United Kingdom through COSHH and the Workplace Exposure Limits published in EH40, and, in the wider English-speaking market, through Australia's model Work Health and Safety framework. Comparable obligations exist in the United States through OSHA and NIOSH, whose validated methods are referenced throughout this paper as a widely documented technical benchmark. The common thread across all of these regimes is the same: exposure must be assessed reliably, compared against a limit, and controlled.

Core concepts: respirable fraction, TWA and STEL

Respirable fraction. Respirable dust is not a single particle size but a defined weighting across sizes. EN 481 and ISO 7708 describe the respirable convention as a penetration curve that gives each particle size a probability of reaching the deep lung. A respirable measurement therefore represents the health-relevant sub-set of total airborne dust, not "all dust".

Time-weighted average (TWA). The TWA is the average concentration of a hazardous substance to which a worker may be exposed over a standard shift, conventionally eight hours, without adverse health effects. It reflects the principle that risk is a function of both concentration and duration: sustained low exposure can be as harmful as a brief peak, depending on the substance. National limits are expressed as TWAs (for example, the German general dust limit of 1.25 mg/m³ for the respirable fraction) and serve as the benchmark for compliance.

Mathematically, the TWA is:

$$TWA = (C_1 \cdot t_1 + C_2 \cdot t_2 + \dots + C_n \cdot t_n) / \sum t$$

where C is the concentration measured during interval t , and $\sum t$ is the normalised shift duration (typically eight hours).

Short-term exposure limit (STEL). While the TWA captures the total inhaled dose over a shift, the STEL guards against acute risk from short-duration peaks that may not move the daily average appreciably but can still cause immediate or cumulative harm. It defines the maximum concentration permitted over a short, defined period, commonly 15 minutes, and is evaluated as a rolling average over that window.

Both concepts matter throughout this paper: they define what a compliance result must express, and they are precisely where real-time and integrated methods differ most sharply.

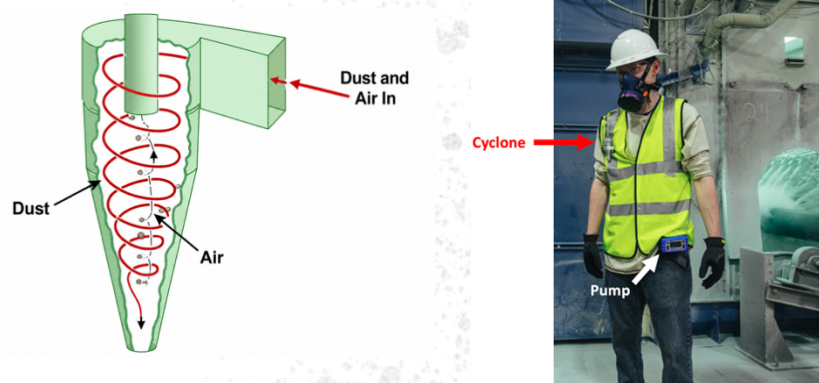
Method 1: Gravimetric sampling

How gravimetric sampling works

Gravimetric sampling determines airborne dust concentration by collecting particles on a filter over a defined period. Air is drawn through a sampling head by a calibrated pump. If the flow rate changes substantially, the size-selection characteristics of the cyclone also change. The sampling equipment must therefore be selected, calibrated and operated according to the chosen method.

Before sampling, the filter is conditioned and weighed under controlled laboratory conditions. During the measurement, the pump records a known air volume while dust accumulates on the filter. The sampling period is selected to collect enough material for reliable analysis without overloading the filter. After the measurement, the filter is returned to the laboratory, re-conditioned, and weighed. The average dust concentration is calculated from the ratio of the mass increase to the sampled air volume. Where the composition of the dust must be determined, the filter is analysed using a substance-specific method. For respirable crystalline silica, for example, X-ray diffraction or infrared analysis may be used instead of relying on total mass alone.

The result is then assessed against the applicable occupational exposure limit and measurement strategy. Its reliability depends not only on the laboratory analysis, but also on correct sampler selection, pump calibration, representative placement and suitable sampling duration. The method provides a quality-controlled average concentration over a known air volume and period, making it suitable for formal exposure assessment.



Strengths of gravimetric sampling

Standardised and defensible assessment

Gravimetric sampling is strongest when the question is “Is the workplace compliant with the applicable limits?” That is why it remains central to formal occupational hygiene. In Europe, EN 482 sets the performance requirements a measurement procedure must meet and EN 689 defines how results are compared with occupational exposure limits; validated methods define equipment, flow rates, blank handling, weighing conditions, calculations and quality control. Equivalent principles apply elsewhere: the UK COSHH framework requires exposure to be adequately assessed and, where necessary, monitored; Australia’s model WHS framework requires air monitoring where exposure cannot otherwise be reliably determined; and the US OSHA/NIOSH system adds laboratory accreditation, NIST-traceable calibration and analytical performance requirements.

Substance-specific laboratory analysis

Gravimetric sampling can be combined with substance-specific laboratory analysis when the question extends beyond total dust concentration. For crystalline silica, the laboratory identifies and quantifies specific silica polymorphs (quartz, cristobalite, tridymite), accounts for analytical interferences and applies a listed procedure. This addresses a different measurement objective than an optical estimate, which reports concentration from a light-scattering response and cannot, by itself, identify the material.

Exposure-limit comparison

Because gravimetric methods produce integrated concentrations over defined time windows, they map directly onto how limits are written. European OELs and their national equivalents are expressed as 8-hour TWAs (with short-term limits where relevant), and compliance strategies such as EN 689 are built around personal, breathing-zone samples. The regulatory framework is, in effect, designed to receive integrated samples and compare them with TWAs, one reason gravimetric sampling remains the reference point in most compliance systems.

Limitations of gravimetric sampling

Detection limits constrain results at low concentrations

Laboratories have method-specific limits of detection and quantification. Regulatory authorities in many countries have been progressively lowering occupational exposure limits, which increasingly turns these analytical limits into a practical constraint. If the measured concentration is above the limit of quantification, the laboratory can report a reliable numerical result. However, if the result is reported as below the detection or quantification limit, and that analytical limit is higher than the applicable exposure limit, the result cannot confirm whether exposure was below the regulatory threshold. It only shows that the concentration could not be determined reliably with the selected analytical method.

Post-sampling delay in analytical results

Gravimetric sampling has clear limitations for daily operational exposure control. The first is the delay between collection and result. Sampling happens in the workplace, but the result is available only after the filter has been equilibrated and re-weighed, or after substance-specific analysis such as XRD for silica. The accreditation and quality-control requirements that make the result defensible also place it after the exposure period rather than during the exposure event.

Attribution of integrated exposure to specific tasks and events

A personal gravimetric sample provides an integrated result for the sampled shift or task, but the filter does not reveal which individual activity or process condition contributed most to the measured mass. Attributing exposure to specific events, material handling, cleaning, a ventilation change, requires supplementary information such as detailed task logs, time-resolved observations or video documentation. This follows directly from the integrated nature of the method.

Operational and laboratory effort

Gravimetric integrity depends on pump calibration with a representative sampler in line, correct cyclone orientation, filter equilibration, blanks, controlled weighing, same-balance practice and, for regulated silica, accredited laboratories with current methods, calibration checks and interference handling. This is precisely why the data are defensible and also why repeated campaigns consume planning, labour, logistics and laboratory capacity.

Limited temporal resolution of the result

OELs are expressed as 8-hour TWAs, and gravimetric methods integrate over a defined period. Such measurements are appropriate for compliance and long-term characterisation, but a full-shift result does not retain the distribution of exposure within the shift. It cannot show whether the same average arose from stable exposure or from a few short, high-concentration events. Short-term peaks can be assessed gravimetrically only if separate, task-specific short-duration samples are collected, they cannot be reconstructed retrospectively from a single full-shift filter.

Method 2: Optical real-time monitoring

How optical real-time monitoring works

Optical real-time monitoring uses the interaction between light and airborne particles to estimate concentration continuously. In the basic approach, light scattered by particles is used to estimate particle mass concentration: a light source illuminates the sampled air, a receptor detects the scattered light, and concentration is estimated from a response curve. In higher-sensitivity optical particle counters, the estimate is based on the strength of the scattering signal itself.

The instrument is therefore not directly “weighing dust in air”. It measures an optical signal and uses an embedded model to convert it into particle counts, approximate size information and/or mass-concentration surrogates. Particle-size estimation enters because scattering behaviour changes with size; calibration enters because scattering also changes with particle shape, composition and optical properties. As US EPA guidance notes, the amount of scattered light can vary with particle size, shape and chemical composition, and sensor bias can shift if the source, particle type or size distribution changes.

The technical consequence is important: an optical monitor is only as accurate as the relationship between the aerosol it is seeing and the aerosol assumptions built into its calibration. Calibration, collocation and correction are therefore central practices rather than optional extras, checking and adjusting the instrument against a certified standard, running it alongside a reference instrument, and adjusting the output to improve agreement with known reference values.

This is why parallel use with a reference method is powerful. Running an optical device alongside a filter-based method for a given aerosol, task mix and environment supports a site- or material-specific correction model, which materially improves usefulness for day-to-day control. It does not, however, automatically convert the optical method into a legally equivalent replacement for a prescribed compliance method: it improves interpretability and local agreement, not the underlying regulatory status.

Optical monitors can be deployed in several modes, stationary near a source, mobile, ambient, indoor, occupational, and the placement determines what is measured. A fixed instrument reflects conditions at that location; a personally worn instrument better reflects the individual’s moving exposure zone. The technology is the same; representativeness changes with placement. Crucially, real-time monitoring starts with a time series rather than a single integrated average, which changes the kind of question the data can answer.

Strengths of optical real-time monitoring

Reliable results even at low concentrations

Optical monitoring provides continuous, time-resolved visibility into changes in dust concentration. It can show whether exposure is rising or falling, reveal short peaks and support comparisons between tasks, processes and control measures, even where a laboratory result only reports a value below its analytical limit. This gives safety teams additional operational insight between formal measurements.

Temporal context and task attribution

Real-time monitoring is strongest when the question is “What happened during the task, and when?” Because it produces continuous measurements rather than a single post-laboratory number, it is far better suited to identifying peaks, timing and pattern changes. When the monitor is worn or

placed close to the process, the time series can be aligned with task observations, shift events, process changes, ventilation adjustments and cleaning activities. That association is an inference from combining continuous readings with field observations, but it is exactly the operational question time-resolved data are built to answer.

Control verification

The same time resolution makes real-time monitoring well suited to verifying controls. When local exhaust ventilation is switched on, containment is changed or a dusty step is modified, the question is often not just whether the quarterly average fell, but whether the control changed the exposure pattern during normal work today. Continuous measurement makes that response visible immediately, with the choice of averaging left to the application.

Trend analysis between formal campaigns

Real-time instruments are also well matched to the “what changed between campaigns?” problem, seasonality, process drift, different operators, altered raw materials or varying ventilation. Air-sensor guidance explicitly recognises supplemental and informational uses such as spatiotemporal variability, comparison studies, hotspot detection and long-term change, all of which map naturally onto workplace monitoring between formal measurements.

Immediate alerts and worker engagement

Where alarm-enabled devices are used, real-time monitoring can support immediate alerts and worker engagement. This is not a property of light scattering alone but of pairing continuous measurement with a live display, thresholds or alarms. Once an invisible hazard becomes visible during the task, the worker and supervisor can respond while exposure is occurring rather than after laboratory turnaround.

Limitations of optical real-time monitoring

Not automatically a regulatory replacement

Optical monitoring is not, by default, a compliance method. Air sensors are described primarily as tools for supplemental and informational monitoring, and, more importantly for occupational compliance, European practice (EN 482 performance requirements, EN 689 comparison strategy) and other regimes such as OSHA’s silica standard require specific validated methods, accredited laboratories and quality control for the analyses that demonstrate compliance. A well-calibrated optical monitor can be extremely useful for prevention and investigation without being the method a regulation prescribes.

Not inherently substance-specific

Optical devices respond to light scattered by particles; they do not distinguish quartz from gypsum or cellulose from a generic particulate signal. Because scattered light varies with particle size, shape and composition, different aerosols can produce different responses at the same mass concentration. A local correction factor can improve agreement for a known aerosol, but that is not the same as material identification by laboratory analysis.

Sensitivity to aerosol properties and environment

Optical outputs are strongly influenced by aerosol properties and environment. Warm temperatures and humid air can increase bias, and changes in particle type, source or size distribution can shift the response over time: humidity can alter apparent size, composition can change refractive behaviour

and different processes change the size distribution the sensor sees. This is exactly why interpretation, maintenance and periodic collocation matter so much.

Direct comparison

The two methods are best understood side by side. Neither is “better” in the abstract, each is superior for the question it was designed to answer. The table below summarises the contrast that the preceding sections established.

CRITERION	GRAVIMETRIC	DUSTLIGHT
Real-Time Visibility	 LOW	 HIGH
Personal Exposure Measurement	 HIGH	 HIGH
Compliance Implications	 HIGH	 MEDIUM
Evidence that protective measures are effective	 MEDIUM	 HIGH
Detection of Exposure Peaks	 LOW	 HIGH
Support for Swift Action	 LOW	 HIGH
Determination of material composition	 HIGH	 NOT POSSIBLE
Suitability for Long-Term Trend Analysis	 MEDIUM	 HIGH
Simplicity for HSE Teams	 MEDIUM	 HIGH
Costs and Operating Expenses	 HIGH	 MEDIUM
Value for the immediate protection of workers	 LOW	 HIGH
Locating the Source of Exposure	 MEDIUM	 HIGH

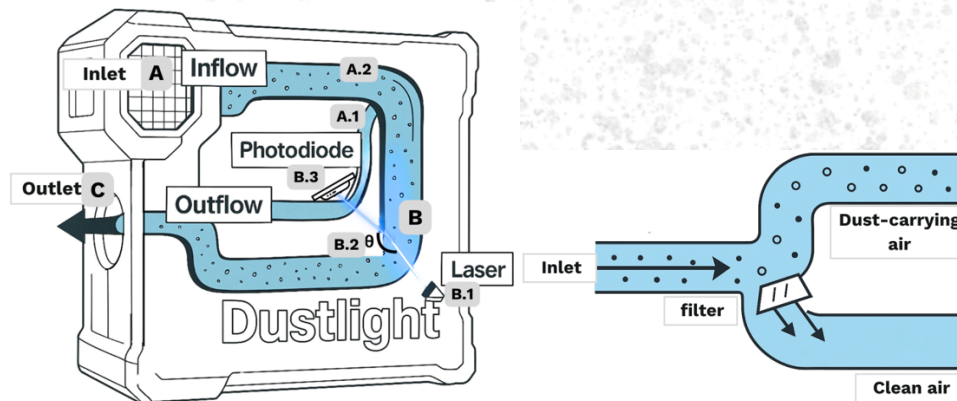
The table shows the areas in which gravimetric measurements and Dustlight are most beneficial to safety teams.

The comparison points to a single conclusion: the methods are complementary. Gravimetric sampling provides the defensible integrated value; optical monitoring provides the temporal context. The remainder of this paper shows how Dustlight is built to occupy the optical role, and how the two methods combine in practice.

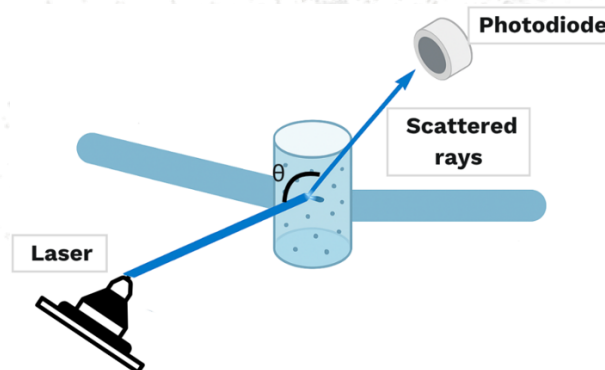
Dustlight in practice

Dustlight is a wearable optical dust monitor built for the complementary role described above: continuous, worker-level measurement that adds temporal context and immediate feedback alongside, not instead of, gravimetric reference sampling.

How the sensor measures



At the intake (A), air passes through a removable, close-meshed grille that filters coarse particles. It then enters a settling chamber, where larger, non-relevant particles settle out before measurement. After mechanical pre-filtering, the airflow is divided in two: one part is cleaned by a filter (A.1) and fed as sheath air between the ambient air flow and the photodetector (A.2), which prevents dust particles from being deposited on the sensor optics.



The sensor is based on three core elements: a laser (B.1), a photodiode (B.3) and the physical phenomenon of light scattering. The laser emits a focused beam into the airflow within the measuring chamber; as particles pass through the beam, they scatter the light. The photodiode, positioned at a defined angle (B.2), detects this scattered light and converts its intensity into an electrical signal for processing. The amount and pattern of scattered light depend on the size and concentration of the particles, so analysing the photodiode signal allows the system to determine particle concentration in real time, even in dynamic and harsh environments.

Dustlight also includes an automatic self-cleaning function, activated every two hours, which briefly increases the fan speed so that any deposited particles are loosened before they can affect the measurement.

A processing algorithm transforms the raw sensor signals step by step into concentrations for the individual PM sizes and for the respirable and inhalable fractions. To ensure that every device measures consistently, each sensor is compared against a reference instrument and calibrated to match it, so that all sensors measure alike. Once the individual PM-size concentrations are

determined, the respirable-dust algorithm applies the EN 481 / ISO 7708 respirable convention, the size-dependent weighting describing how likely each fraction is to reach the deep lung, to yield the respirable-dust concentration.

Real-time exposure metrics

TWA in real time. Whereas gravimetric measurement yields a single TWA derived from filter mass and airflow over the shift, Dustlight calculates the TWA dynamically, updating the running average as new data arrive. The TWA rises continuously as exposure accumulates, even if the instantaneous concentration later falls. This cumulative behaviour makes early detection and trend analysis valuable: once the projected running TWA approaches or exceeds the applicable limit, exposure should be reduced or stopped, and even brief high-exposure periods early in a shift can push the projected TWA close to the limit.

STEL in real time. The STEL is implemented as a rolling window. At every time point the system evaluates the average concentration over the preceding 15 minutes; the window advances continuously (08:00–08:15, then 08:01–08:16, and so on). If any 15-minute window exceeds the applicable STEL limit, an exceedance is registered.

PARAMETER	RULE	EXPLANATION
Max. short time period	15 min	STEL is the average exposure over continuous 15-minute period.
Max. exceedance frequency	≤ 4 times per 8-hour shift	No more than four exceedances are allowed within a standard workday.
Min. interval between peaks	≥ 1 hour between STEL exceedance periods	To allow recovery, each exceedance must be separated by at least 60 minutes.

Real-time STEL evaluation in the Dustlight application.

Particle size. Dustlight converts the optical signal into time-resolved concentrations for PM₁, PM_{2.5}, PM₄, PM₁₀ and respirable dust. For a selected period, the application shows the relative contribution of each fraction, indicating which fractions dominated and how the distribution changed over time. This helps interpret process-related dust patterns, although the device does not identify the chemical composition of particles.

Material configuration

Results are calculated using a selected material configuration. Each predefined configuration contains a conversion factor for the relevant aerosol, and the user selects the configuration that best matches the material being processed. If no suitable option exists, a custom configuration can be created: its factor is derived from parallel gravimetric reference measurements and entered in the application. Any number of custom configurations can be stored and reused, the mechanism by which optical results are aligned to a specific hazardous material.

Real-time alerts

Real-time data make changes in exposure visible while work is taking place. Dustlight compares the measured concentration with configured thresholds and communicates the current status through green, yellow and red LEDs, with an optional acoustic warning. Yellow indicates that exposure is approaching a critical level; red signals that immediate action is required. Workers can therefore adjust the task, process or control measures while exposure is occurring rather than after the shift.

LED ALERT	BASIS OF OPERATION	USE
● Green	The current measured value is below the warning threshold and the limit.	Continue working under the current conditions.
● Yellow	The warning threshold has been reached, there is a clear exposure to fine dust particles.	Preventive measures should already be taken here to reduce the release of dust.
● Red	The limit value was exceeded, and the dust concentration is in a range that is harmful to health in the long term.	More effective measures should be taken to avoid dust and personal protective equipment should be worn if dust exposure cannot be avoided.

LED status thresholds relative to the exposure limit.

Software, reporting and fleet management

Because the device is worn by the worker, the data provide worker-level visibility across changing tasks and locations. Events can be recorded in the application to mark tasks, process changes or observations, and then aligned with the measurement curve to identify the activities associated with elevated exposure.

PDF reports combine time-resolved measurements with TWA and STEL values, exceedances, particle-size fractions and recorded events. Compliance views help HSE teams interpret results against the configured occupational exposure limits, without presenting the optical measurement as a substitute for a prescribed reference method. Exposure trends can be reviewed by day, week or month; device-utilization data show when, for how long and by which worker a device was used; and fleet management consolidates data from devices across work areas or sites in a cloud dashboard, so authorized users can access device status, worker-level measurements, trends, reports and utilization without collecting each device physically.

Bringing the two methods together

Dustlight and gravimetric sampling provide different types of exposure information. Gravimetric sampling determines an integrated mass concentration over a defined period using a recognized reference procedure; Dustlight records a time-resolved optical profile over the same period. Three complementary patterns of combined use follow.

Use case 1: Parallel use with gravimetric method

For example, during stainless-steel welding, Dustlight and a gravimetric sampler can be worn in parallel while the same welding process, base material and consumable are used. The gravimetric result provides the reference mass concentration for that specific welding fume, while Dustlight records the time-resolved profile during the task. The relationship between the two results yields a correction factor for that aerosol, which is stored in Dustlight as a custom material configuration for stainless-steel welding fume and applied to later measurements under sufficiently comparable process and material conditions. This allows the optical measurement to better reflect the specific hazardous material being monitored.

Where required, the collected filter can also undergo substance-specific laboratory analysis to determine relevant components of the welding fume, or any other hazard exposed in your workshop. Based on the identified material, users can select an existing Dustlight material configuration with the appropriate correction factor already applied. Where no suitable configuration exists, a custom material configuration can be created from the parallel measurement data.

Use case 2: In preparation for a gravimetric campaign

For instance, in a foundry producing cast-iron components, dust exposure can differ substantially between mould preparation, shakeout, fettling and cleaning. Dustlight can be used before formal sampling to identify which tasks, workers and time periods generate the highest or most variable concentrations. The gravimetric campaign can then focus on the most representative conditions, for example, fettling cast-iron parts with abrasive tools, so that the formal result verifies exposure during a well-chosen, defined task and assesses whether the existing extraction and work practices are adequate.

Use case 3: Between formal measurements and in daily operations

In a woodworking facility processing hardwood panels, exposure may change between sawing, sanding and cleaning, and may also vary with ventilation, open doors, humidity or operator technique. Dustlight can be used between gravimetric campaigns to document these changes during normal shifts. Exposure trends and task records show whether concentrations rise during specific activities, such as manual sanding of hardwood edges, or whether control performance drifts over time. The results support reviewing work practices, adjusting extraction or cleaning procedures and deciding when another formal measurement is required.

The combined picture

Used together, gravimetric sampling and Dustlight provide both formal evidence and operational insight, and the approach transfers across industries, tasks and materials, provided the measurement setup, material configuration and operating conditions suit the aerosol being assessed. Gravimetric sampling confirms exposure over a defined period; Dustlight shows what

happened within that period and what changed afterwards. Together they support more effective prevention, more focused compliance activity and more efficient HSE operations.

Conclusion

Gravimetric sampling and real-time optical monitoring should not be treated as interchangeable. They answer different questions, and each has distinct strengths and limitations. Gravimetric sampling provides an integrated mass concentration over a defined period using recognized procedures, well suited to formal exposure assessment, comparison with occupational exposure limits under EN 689, substance-specific laboratory analysis and defensible compliance documentation. Its main limitation is that the result becomes available only after sampling and analysis; it does not show when exposure occurred, which task caused a peak or how conditions changed within the sampling period.

Real-time optical monitoring supplies the missing temporal context. It shows how exposure develops during tasks, enables immediate worker alerts and supports the assessment of changing materials, processes, operators and environmental conditions. However, optical measurements are influenced by aerosol properties, require an appropriate material configuration and do not automatically replace prescribed reference methods.

Used together, both methods provide stronger evidence for compliance and better information for day-to-day prevention. Gravimetric sampling establishes the formal reference value; real-time monitoring explains how that exposure developed and whether controls continue to perform under routine conditions. This combination supports more targeted measurement planning, earlier intervention and more efficient HSE decision-making, and it is the role Dustlight is designed to play.

Glossary

AGW (Arbeitsplatzgrenzwert) ,The German occupational exposure limit value for a hazardous substance in workplace air, published under the TRGS series.

COSHH ,Control of Substances Hazardous to Health Regulations ,the UK framework requiring employers to assess, prevent or adequately control workplace exposure to hazardous substances and to monitor exposure where appropriate.

EN 481 ,European standard defining the inhalable, thoracic and respirable particle-size fractions for health-related aerosol sampling.

EN 482 ,European standard setting the general performance requirements for procedures used to measure chemical agents in workplace air.

EN 689 ,European standard defining the strategy for measuring inhalation exposure and comparing it with occupational exposure limit values.

EH40 ,UK publication (EH40/2005) listing Workplace Exposure Limits (WELs) under the COSHH framework.

HSE ,Health, Safety and Environment ,the workplace function responsible for managing occupational risk. (In the UK, also the Health and Safety Executive, the national regulator.)

ISO 7708 ,International standard defining inhalable, thoracic and respirable particle-size fractions for health-related sampling; the international counterpart to EN 481.

LEV ,Local exhaust ventilation ,engineering controls that capture airborne contaminants at or near their source.

NIOSH Method 0500 ,US method for determining the mass concentration of total airborne particulate matter (Particulates Not Otherwise Regulated, Total).

NIOSH Method 0600 ,US method for determining the mass concentration of respirable airborne particulate matter using a size-selective cyclone and filter.

NIOSH Method 7500 ,US method for identifying and quantifying crystalline silica by X-ray diffraction.

NIST-traceable calibration ,Calibration linked through a documented, unbroken chain of comparisons to measurement standards recognised by the US National Institute of Standards and Technology.

OEL ,Occupational exposure limit ,the maximum permitted airborne concentration of a substance, expressed as a TWA and/or STEL.

OSHA ,US Occupational Safety and Health Administration, responsible for setting and enforcing workplace safety and health standards.

OSHA ID-142 ,OSHA analytical method for identifying and quantifying crystalline silica by X-ray diffraction.

PEL ,Permissible Exposure Limit ,a legally enforceable occupational exposure limit established by OSHA.

PM ,Particulate matter ,solid particles and liquid droplets suspended in air. Size categories such as PM₁, PM_{2.5}, PM₄ and PM₁₀ refer to particles within defined or estimated size ranges.

PVC filter ,Polyvinyl chloride membrane filter used to collect airborne particulate matter for gravimetric weighing or laboratory analysis.

QC ,Quality control ,procedures verifying the reliability of sampling and analytical results, including blanks, calibration checks, reference materials and performance criteria.

Respirable fraction ,The sub-set of airborne dust, defined by EN 481 / ISO 7708, that penetrates to the gas-exchange (deep-lung) region of the respiratory system.

STEL ,Short-Term Exposure Limit ,an occupational exposure limit averaged over a short period, commonly 15 minutes.

TRGS ,Technische Regeln für Gefahrstoffe ,the German Technical Rules for Hazardous Substances, which implement and detail occupational exposure requirements.

TWA ,Time-Weighted Average ,the average airborne concentration over a defined exposure period, commonly an eight-hour working day.

WEL ,Workplace Exposure Limit ,an occupational exposure limit under the UK COSHH framework, published in EH40.

WHS ,Work Health and Safety ,the Australian framework, including the model WHS laws and requirements for managing exposure to airborne contaminants.

XRD ,X-ray diffraction ,a laboratory technique used to identify and quantify crystalline silica polymorphs (quartz, cristobalite, tridymite).

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