Introduction to Industrial Dust Monitoring
“Every year thousands of people die of lung disease or get asthma because of airborne contaminates they have breathed in at work. Many Employers install local exhaust ventilation to protect workers health, but it doesn’t work. This may be because its the wrong type or because its not properly installed, used or maintained.”

Reference: Health and Safety Executive, UK
Dust in Industrial Air Quality

Typical challenges
• Wide range of sources
• Large footprint
• Difficult to monitor
• Difficult to manage
• Continuous changing footprint (temperature, weather, humidity, size...)

Dust control is often a large complex problem

Dust is often a site-specific problem
Risks

- Health & Hygiene
- Possible explosions
- Equipment failures
- Neighborhood Nuisance
- Unprofessional working environment
- Product loss
How Dust Control is Handled Today

• Dust Control
  • Ventilation
  • Dust suppression
  • Filtration
  • Controlling the dust at the source

• Drawbacks and Challenges
  • High energy impact
  • High water consumption
  • Continuous maintenance needed
  • Changing footprint
How Dust is Monitored Today

Compliance Monitoring

Requirements
- Often industry specific regulation
- Threshold limits adopted by hygienists
- Compliance measurements adopted by local authority
- Precise analysis required
- Reporting done in intervals
- Grab sampling
- PM10, PM2.5, PM1
- Personal dust monitors

Drawbacks
- Slow and involves sampling
- Requires highly accurate and highly priced analyzers
- Not suitable for quick response to dust events
- Grab sample analysis could take days
Real Time Trend Monitoring

Real time dust monitoring
- Controllers know the dust level in real time
- Allows the possibility to respond to dust events quickly
- Supports the mandatory compliance monitoring to pinpoint source
- Trigger dust control measures quickly and efficiently
- Trigger local sound or siren if dust levels increase above a predetermined level

Drawbacks
- Real time dust monitors not highly accurate
- Calibration
Primary Drivers

- Combustible Dust
- Nuisance Dust
- Health & Hygiene
- Filtration Monitoring
- Process Improvement
- Compliance Monitoring
Combustible Dust

Given proper conditions, dust can become a serious risk. Monitoring for dust can help mitigate the risk of:

- Employee death or injury
- Fires
- Destruction of entire facility
Realtime dust monitoring can significantly mitigate the risk of explosions

**Combustible Dust**

Realtime dust monitoring can significantly mitigate the risk of explosions

*Dust clouds*

*Dust accumulation*
Health And Hygiene

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Health and Hygiene

Implementation of dust monitors

- Monitoring total suspended dust in chosen areas 24/7
- Immediately alert operations when abnormal dust levels are detected
- Define the source and areas quickly
- Trend and historically record dust levels throughout the plant

Continuous trend monitoring will help verify that the primary dust control is operating properly. If total airborne dust is rising—a problem is likely to exist
Nuisance Dust

Fugitive dust is often considered harmless but frequently is the source to secondary problems.
Nuisance Dust

Fugitive/Nuisance dust or dust not coming from a combustion source, accounts for about 90% of all emissions. When airborne PM crosses the property lines the facility may be subject to local Nuisance laws.
Filtration Monitoring

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Reference: Health and Safety Executive, UK
Filtration Monitoring

Dust monitoring to optimize dust collection systems could be the single most significant action companies can make to improve dust control.
Sintrol has a long history on providing real-time dust monitoring solutions to increase the profitability of our customers.

We provide best practice solutions that give our customers a high ROI.
Process Improvement

Examples process improvements
• Prevent product loss
• HazLoc supervision
• Increased filter life
• Avoid downtime
• Saving Utilities
• Improving sustainability
Monitoring for unexpected events

Examples of unwanted events

• Change in process conditions
• Fresh air intake is contaminated
• Dust control not optimized or undersized
• Dust collection system failure
• Poorly fitted filter or leaking filter
• Inadequate water supply
• Interruption of clean cycle
• Disturbance in ventilation
• Leaking filter media
• Loss of material