

The Importance of Contamination Control at Floor Level

High Performance  
Contamination Control Zones

## Particulates Matter

Particulate contaminants are known to adversely affect quality, product yield, operational effectiveness and profitability. Particles can be viable or non-viable, made from different materials, come from different places and travel large distances. There are two main types of contamination:

1. **External** - gross atmospheric contamination, which infiltrates your facility.
2. **Internal** - the human body can generate 5-10 million skin, hair, dirt, and clothing particles every minute.



### Particles outside the critical area present a potential problem

Especially the small, light, invisible particles. Even fairly loose particles that have settled on the floor are easily crushed into very small particles and redistributed back into the air due to vortices created by the movement of personnel. These airborne particles become suspended in the air and get carried into the critical area where they present a potential hazard.

### It's not what we can see, it's what we can't see...

The smallest particle the human eye can see is in the order of 50 microns. So how can we measure the particles that we cannot see but are present on the floor and in the air?

In the late 1900's *Professor Tyndall* noticed floating dust in the air when a beam of sunshine entered a partially darkened room. (1) He invented a practical tool 'The Dust Lamp', which is a simple qualitative tool for making fine particle clouds visible.

The dust lamp in this context usually shows that particle clouds occupy a far greater volume of air than is suspected.

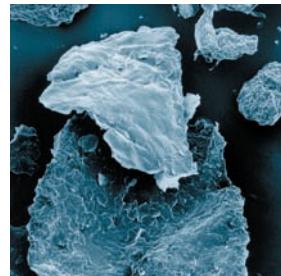
The presence of many different types of particles, both solids (eg dusts, fumes and fibres) and liquids (organic or inorganic mists), can be revealed by the dust lamp.

Some of the important general properties of fine particles can be summarised as follows:

- They move with the air in which they are suspended.
- Due to gravity they settle out of the air slowly and can remain airborne for long periods of time.
- As they settle, they risk contacting and contaminating critical products and processes.



A snapshot of particulates made visible with a dust lamp

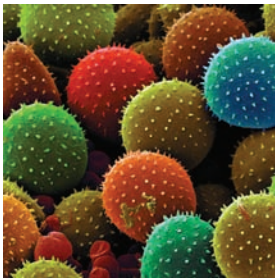


Scanning electron microscope image of human scales [mag x 500]

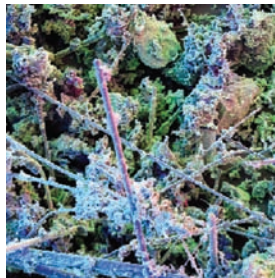
The small, light, particles (<5um) normally invisible to the naked eye are commonly called Airborne Molecular Contaminants (AMCs) or Ultra Fine Particles (UFP's). They can become suspended for hours in the surrounding environment where they quickly spread polluting the atmosphere.

Many of us have personal experience of allergies. They are commonly caused by unseen airborne allergens such as pollen, mould spores and dust mites, which float in the air and are inhaled.

- A 1-micron particle may take as long as 15 hours to settle without movement. (2)
- Pollen has been found 400 miles out to sea and 2 miles up in the air. (3)



Scanning electron microscope image of fungal spores.  
[Mag x 500]



Scanning electron microscope image of human skin scales.  
[Mag x 160]

## Frequently Asked Questions

### How can Dycem add value as I do not have a quality or yield problem?

Does this mean you have no quality or yield issues relating to particulate contamination? Or does it mean you are performing within limits?

ISO cleanroom standards recommend and Current Good Manufacturing Practices (cGmp) requires that the introduction of particles into critical areas is minimised and audit bodies such as the FDA require companies to continuously improve.

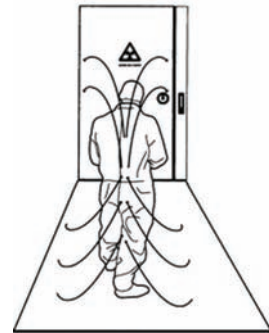


Dycem installed in the corridor of a major Pharmaceutical facility

### What if we have Laminar Air Flow?

Even with Laminar Airflow you still need to be concerned about particulate contamination.

Positive air pressure will mean that there is a high concentration of particulate contaminants just outside the critical area. An unprotected floor will allow these contaminants to be picked up on the sole of personnel shoes and on the wheels of carts where they are tracked into the critical area. Here there is a risk of them becoming redistributed back into the atmosphere.



#### Four quick and easy ways to find out if contamination is in the air or on the floor

- Wipe your floor at the entrance way & inside the critical area with an alcohol wipe - if it gets dirty you should consider Dycem.
- Place a sample of Dycem on the floor and walk over it, if the first step leaves an imprint take multiple steps until no more contamination is being removed. This will give you a good indication on the level of contamination and the size of Dycem that you need.
- Use a high intensity dust lamp with a dark backdrop to detect the previously invisible airborne particulates - you will be amazed.
- Ask Dycem to conduct a particle count or bacteria test.



Dycem covers the whole changing area at Philips, France.



Dycem WorkZone controls contamination from wheeled traffic in a major research facility

## The Dycem Solution

For minimal investment, Dycem will dramatically reduce contamination and particle counts, helping you to improve your product quality, yield and profitability.

Using Dycem at all entrances and inside the critical area reduces the risk of contaminated products from 100% to **just** 8%.

### Why is Dycem so effective?

- Independent studies show that 80% of contamination enters the critical area through entrance ways at or near floor level.
- Using a correctly sized and maintained piece of Dycem at all entranceways will reduce the 80% by 99.8% (4)
- This leaves the 20% of the contaminants that have got into the critical area still to be addressed. Using a correctly sized and maintained piece of Dycem inside the critical area reduces air borne contamination at critical operational height by 60% (5)
- All this results in an overall reduction in the risk of contaminated products and processes by 92%.

## References

- 1) The dust lamp A simple tool for observing the presence of airborne particles.  
<http://www.hse.gov.uk/pubns/mdhs/pdfs/mdhs82.pdf>
- 2) CLEANROOMS - What to Look For by Abraham Marinelarena  
[http://www.bathgroup.com/article\\_cleanrm.html](http://www.bathgroup.com/article_cleanrm.html)
- 3) Aerias Pollen in the Indoor Environment  
<http://www.aerias.org/kview.asp?DocId=141&spaceid=1&subid=5>
- 4) C. Clibbon. An evaluation of the effectiveness of polymeric flooring compared with "peel-off" mats to reduce wheel- and foot-borne contamination within cleanroom areas. European Journal of Parenteral Sciences 2002; 7(1): 13-15 © 2002 Parenteral Society.
- 5) L. S. Ranta. An evaluation of polymeric flooring and its effectiveness in controlling airborne particles and microbes. M-Con Technologies, Mission Viejo, CA 92691 Euromed Communications Ltd.

Please contact us for specialist advice on the right option for your facility:

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**ProtectaMat** - is a loose laid mat designed to control foot and wheel borne contamination. The ProtectaMat is also available with a self-adhesive backing option for heavier wheeled traffic.



**CleanZone** - is a High Performance Contamination Control Zone designed to attract, collect and retain viable and non-viable contamination. Suitable for light wheeled traffic and heavier pedestrian flows. Available in a range of mat or floor covering options to suit your facility's needs.



**WorkZone** - is a heavy duty version of CleanZone designed for use where there are concerns about contamination and cross contamination from personnel, and the wheels of carts including pallet trucks, fork lifts, trolleys & vessels.



**Cleaning** - Dycem recommend their high performance range of cleaning products and equipment, designed to maximise product performance and life cycle.



**Bench Mat** - prevents movement of components and loss of small items. Improves accuracy, precision and assembly time and great for stabilising fragile laboratory equipment.



**Non-slip products** - Dycem Non-Slip products are non-sticky but amazingly grip to dry surfaces without the use of an adhesive. They effectively cushion, stabilise and protect products and equipment. Dycem Non-Slip is available in a range of product options including reels, mats, self-adhesive panels and discs.

**Dycem**<sup>®</sup>



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