



The Science Behind Particle Counting

Part 3 of 3

Particle Losses in Particle Counting Tubes

Understanding Particle Loss in Tubing: A Beginner's Guide

When measuring particles in cleanroom environments, it's important to understand how particles can be lost while traveling through tubing. This guide will explain what causes particle loss and how to minimize it, using basic terms and practical advice.

What is Particle Loss?

Particle loss happens when particles traveling through a tube don't reach their destination. Instead, they stick to the tube walls or settle inside. This can lead to inaccurate particle measurements.

Factors That Affect Particle Loss

Several things can cause particle loss in tubing. Here are the main factors:

- **Particle Size and Speed:** Bigger particles are more likely to settle because they're heavier. Smaller particles may also get lost if they move too slowly.
- **Tube Length and Width:** Long tubes give particles more time to settle. Tubes that are too wide can also cause particles to drop to the bottom.
- **Material of the Tube:** Some materials, like stainless steel, are better at preventing particles from sticking.
- **Bends and Fittings in the Tube:** Sharp turns or complex connectors can trap particles.

How to Minimize Particle Loss

You can reduce particle loss by following these simple tips:

- **Use Shorter Tubes:** The shorter the tube, the less chance particles have to settle.
- **Pick the Right Tube Size:** Use tubes that aren't too wide but allow air to flow smoothly.
- **Choose the Right Material:** Use materials like stainless steel that prevent particles from sticking.
- **Avoid Sharp Turns:** Design tubing with gentle curves instead of sharp bends.
- **Match Air Speeds:** Ensure the air speed in the tube matches the environment to collect accurate samples.

Acceptable Levels of Particle Loss

In most cases, some particle loss is acceptable, but it shouldn't exceed 25% for larger particles (around 5 μm). Always check the requirements for your specific setup.

Conclusion

Understanding and managing particle loss is important for accurate measurements. By keeping tubes short, using the right materials, and designing smooth paths, you can minimize particle loss and improve your results.

This article is written by REX Dynamics. We empower controlled environments when it comes to consultation, design, installation, validation & servicing of environmental monitoring solutions. For further information please visit our webpage www.rexdynamics.se or contact us at info@rexdynamics.se