



WEARWELL[®]

An evaluation of PermaTack and its Effectiveness in Controlling Airborne Particles and Microbes

Introduction

This test evaluated PermaTack flooring and its effectiveness at controlling airborne and microbe particulates from reaching critical operational height. This type of contamination is quite problematic in life sciences and the pharmaceutical industry. There were two primary objectives:

1. To establish whether air-borne particulates and microbes of various sizes rose to critical operational height with standard movements of a person in a clean room;
2. To establish whether the use of PermaTack flooring in the critical environment would significantly lowering particulate and microbe counts, i.e. control air-borne contamination.

Test Methodology

Standard tests were carried out in accordance to IEST-RPCC003.21.

In the standard tests, four conditions were evaluated:

- 1 - Without PermaTack Flooring
- 2 - With PermaTack Flooring
- 3 - With PermaTack Flooring and Laminar Airflow
- 4 - Without PermaTack Flooring and with Laminar Airflow

In each test, the test subject wore typical clean room garb including a Tyvek gown, hair cover and polypropylene shoe covers. The first object of the test was to simulate activities in a clean room. The test subject therefore, performed a series of exercises that would mimic the activities in a clean room and would also create air movement that would cause contamination to rise above critical operating heights.

The research team measured various particle sizes ranging from less than 0.5 microns, to approximately

5 microns. This size range is the most critical to the life sciences and electronics industries.

During the tests, air-borne particle counts were measured using a Laser Particle Counter. Airborne microbes were captured on TSA fall-out plates located on the front and rear ledges of the body box. These plates were incubated for seven days following the test and the number of colony forming units (cfu) counted. The total number of airborne particles and microbes at or above 1.067m height were counted for all four standard tests.

Results

Test 1 - Without PermaTack Flooring

- a) Airborne count at or above 1.067 m; particles <0.5 micron
Total count = 1,721,336 particles
- b) Airborne count at or above 1.067 m; particles <5 micron
Total count = 103,986 particles
- c) Microbe colony at or above 1.067m.
Total count = 11 cfu

Test 2 - With PermaTack Flooring

- a) Airborne count at or above 1.067m; particles <0.5 micron
Total count = 1,091,211
This represents a reduction of 630,125 particles, or 36%.
- b) Airborne count at or above 1.067m; particles <5 micron
Total count = 38,952
This represents a reduction of 65,034 particles, or 63%.
- c) Microbe colony count at or above 1.067m
Total count = 4.2 cfu
This represents a reduction of 6.8 cfu, or 62%.

Test 3 - With PermaTack Flooring and with laminar airflow

- a) Airborne counts at or above 1.067m; particles <0.5 micron
Total count = 11,556
This represents a reduction of 1,078,839 particles, or 99%.
- b) Airborne count at or above 1.067m; particles <5 micron
Total count = 2,870
This represents a reduction of 101,116 particles, or 97.24%.
- c) Microbe count at or above 1.067m
Total count = 0 cfu
This represents a reduction of 11 cfu, or 100%.

Test 4 - Without PermaTack Flooring and with laminar airflow

- a) Airborne count at or above 1.067m; particles <0.5 micron
Total count = 12,501
This represents a reduction of 1,660,393 particles, or 99%.
- a) Airborne count at or above 1.067m; particles <5 micron
Total count = 3,442
This represents a reduction of 101,543 particles, or 98%.
- b) Microbe count at or above 1.067m
Total count = 0.5 cfu
This represents a reduction of 10.5 cfu, or 95.45%.



Conclusions

PermaTack flooring reduced microbial contamination by over 60% at levels critical to operational height. In addition, when PermaTack flooring was used in conjunction with laminar airflow, microbial contamination levels were reduced to 0%. PermaTack flooring alone reduced airborne particle contamination levels for particles less than 0.5 micron by 36% at critical operational height, and by 62% for particles less than 5 microns. The use of PermaTack in conjunction with laminar airflow reduced airborne particle contamination by 99% for particles less than 0.5 micron at critical operational height, and by 97.24% for particles less than 5 microns.

If there is a need to reduce the amount of contamination entering a controlled environment, PermaTack is effective in preventing these contaminants from getting into products and processes. It will prevent foot-borne and wheel-borne contaminants from entering a critical environment, and will also reduce airborne particulate as well.