

On the SURFACE

MINIMIZING SURFACE CONTAMINATION



Clean Wiping Efficiency Test Method [*Surface Wipe Drying*]

In cleanroom environments, it's crucial to minimize surface contamination. Since contaminating particles can get trapped in liquid that stays on surfaces, the improved surface wipe drying performance of 100% Polyester KIMTECH PURE* CL3 Wipers, advertised as Clean-Dry Technology, means less liquid residue is left after wiping, resulting in a cleaner cleanroom.

Introduction

Disposable cleanroom wipers are commonly used to clean walls, workstations, equipment and other surfaces in cleanrooms. Because these wipers are used to absorb fluid spills, they must be absorbent and have the ability to wipe a surface clean without leaving a residue and without generating lint particles and extractables that can contaminate the cleanroom. To assess critical wiper performance in cleanroom environments, a test method was designed to measure a wiper's ability to leave a surface cleaned of residual fluid.

TRADITIONAL WIPING TESTS

Several test methods are currently available to measure the absorbent characteristics of cleanroom wipers.

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(Traditional Wiping Tests continued)

Dynamic Wiping Efficiency. Dynamic Wiping Efficiency (DWE) measures both the dry weight of a wiper and its weight after being manually pulled through a liquid insult at a pre-determined speed.

These two measurements, along with the density of the liquid and the volume of the insult, are used to calculate wiping efficiency. Because the wiping motion is performed manually, slight variances in wiping speed and method among different testers can lead to different results. Test results also do not give any indication of how the fluid is distributed on the surface after the wiping motion has been completed.

Therefore, while DWE is a good indicator of the absorbent capacity of the wiper, it does not accurately

Residuals: Materials or chemical residues, originating from the wiping substrate, that remain behind on a surface after wiping. Residuals can be either solid particles (lint) or chemical elemental components (extractables).

ly represent a wiper's ability to retain fluid and leave the surface free of residue.

Absorbent Capacity and Rate. Another test method to determine the absorbent characteristics of a wiper is Absorbent Capacity and Rate as measured by IEST-RP-CC004.3. This method places a wiper in a tray containing a selected liquid and allows the wiper to absorb as much of that liquid as possible. Once the wiper has absorbed to its full capacity, it is removed from the tray and suspended to allow excess liquid to drip into the tray. After 60 seconds of suspension, the mass of the wetted wiper is recorded. This measurement, along with the dry mass of the wiper, area of the wiper, and density of the liquid, can be used to calculate the absorbent capacity per unit area of the wiper. While this method is sufficient for determining how much liquid the wiper can hold, because the wiper is stationary throughout the test procedure, it gives no indication of how the wiper handles the fluid insult in a real-world wiping application. The second portion of this method tests the rate of absorption, measured by recording the time required for the disappearance of a drop of water dispensed onto the wiper from a fixed height. Again, while this method allows one to determine how quickly the wiper absorbs liquid, it does not address the wiper's ability to remove fluid residue from the wiped sur-

DID YOU KNOW?

Cleanroom wipers can have good capacity (how much total liquid the wiper holds) and still have poor surface wipe drying (how well the wiper retains these liquids in use).

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face.

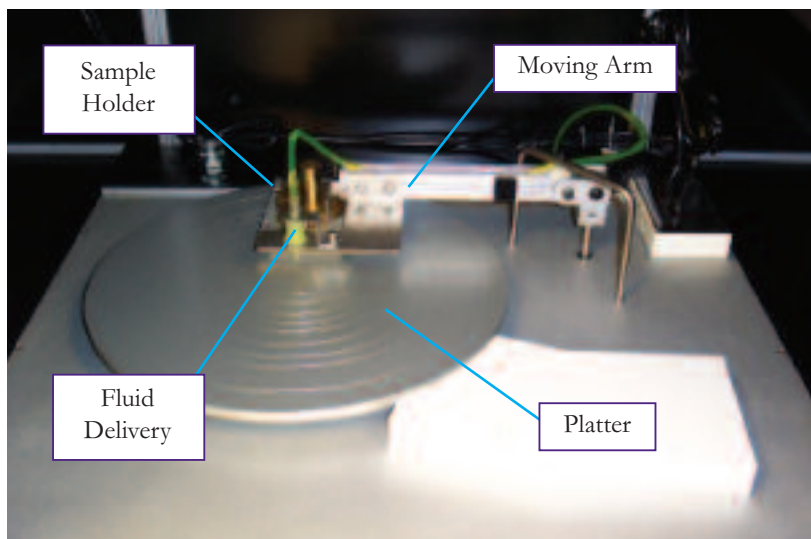
A NEW CLEAN WIPING EFFICIENCY TEST: FEATURES AND BENEFITS

When comparing different wiper performance test methods, it is important to focus on the final effect of the wiper in the cleanroom environment. Because a wiper is used for the purpose of surface cleaning, it is valuable to have a direct measure of the ability of a wiper to clean a surface when selecting a wiper for critical applications.

Kimberly-Clark Professional* has developed the Clean Wiping Efficiency Test Method specifically to measure the surface residual left after wiping. The test has several features that present an advantage over other test methods:

- This versatile method can be altered according to specific wiper application.
- It displays a greater consistency in measuring the performance of a wiper.
- It minimizes tester error.
- It obtains a result related to the previously established methods but is more closely representative of the wiper's actual use in a cleanroom.

Figure 1: Wiping Platter and Arm



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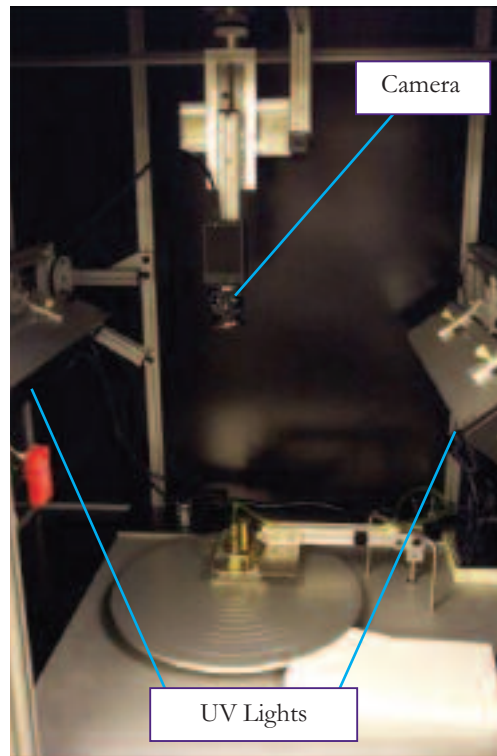
THE TEST METHOD

In the test, a wiper sample is quarter-folded according to standard operating procedure in cleanrooms, and mounted on the padded surface of a sled platter as shown in Figure 1.

The wiper is mounted so the folded edge is the first to come in contact with the liquid insult.

A specified volume of fluid containing a fluorescent solution is applied to the wiping platter through a fixed syringe applicator system. The system is then closed, and the procedure is initiated. During the test procedure, the wiper is passed over the rotating wiping surface using a traverse arm. The wiper sample holder applies a specified pressure to the surface and moves at a steady and fixed rate. At the moment the test movement is stopped, the remaining fluid on the platter is quantified via ultraviolet light and a computerized imaging system (see Figure 2).

Figure 2: Imaging System



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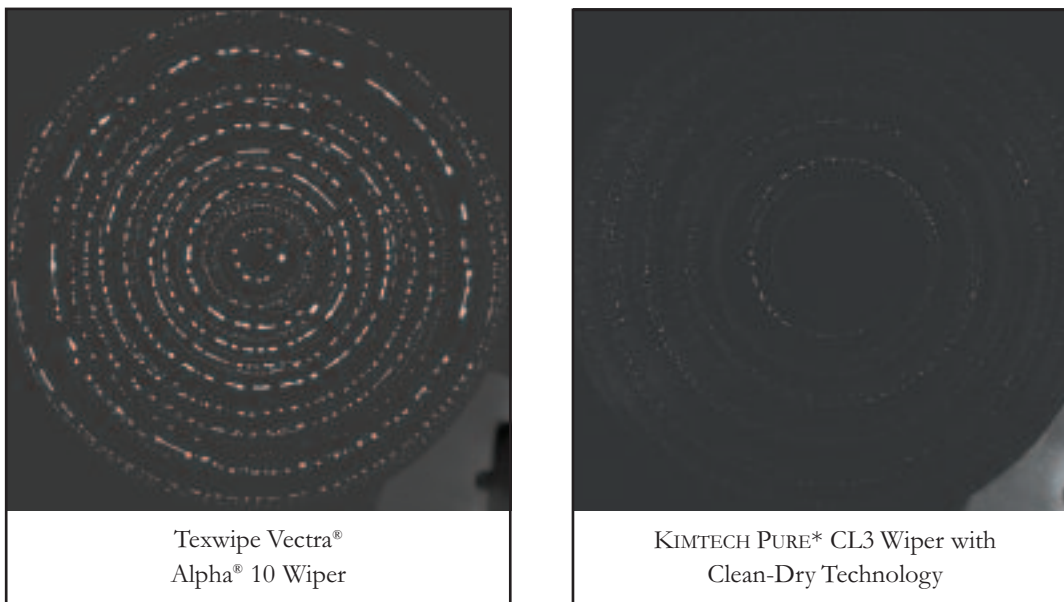
CLEAN WIPING EFFICIENCY TEST RESULTS

The Clean Wiping Efficiency Test camera takes a picture of the fluid residue left on the surface cleaned by the wiper. The image is then analyzed to calculate the area of the surface that is free of the fluorescent solution. In the pictures following, the residual fluorescent solution can be seen swirled around the area of the platter as dotted white regions. For this example, the picture on the left shows the residual left behind after testing a Texwipe Vectra® Alpha® 10 Wiper using this test method, while the picture on the right shows the residual fluid left behind after testing a KIMTECH PURE* CL3 Wiper with patent-pending Clean-Dry Technology. While the visual evaluation gives an indication of how well each wiper does, the dry area calculation quantifies the result with greater accuracy.

The area left free of residual fluid as detected by an absence of fluorescence is then recorded in square centimeters (see Figure 3).

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Figure 3: Fluid Residue



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(Clean Wiping Efficiency Test Results continued)

The Clean Wiping Efficiency Test results of various leading cleanroom wiping products chosen based upon similar advertised performance are listed in Table 1. **The results show that KIMTECH PURE* CL3 Wipers with Clean-Dry Technology demonstrate the ability to deliver the best overall surface cleaning.**

Table 1: Clean Wiping Efficiency Test Results

	Average Surface Wiped Dry (% Clean)
KIMTECH PURE* CL3 Wipers	93.2
Texwipe Vectra® Alpha® 10 Wipers	73.5
Berkshire Ultra-Seal® 3000 Wipers	76.9
Contec® Quilted® 1 Wipers	69.7
Contec® Polywipe-C Heatseal Wipers	76.8
Contec® Polyknit Heatseal Wipers	75.3

SUMMARY AND CONCLUSION

From absorbing spills and lining trays to preparing surfaces/samples and applying surfactants, disposable wipers have become an indispensable tool in cleanrooms and other controlled environments. The new Clean Wiping Efficiency Test Method gives cleanroom professionals a new way to evaluate the real-world performance of wipers against the needs of their specific wiping applications.

In this real-world application, KIMTECH PURE* CL3 Wipers with Clean-Dry Technology demonstrate the ability to deliver the best overall surface wipe drying compared to other leading 100% polyester cleanroom wipers.

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KIMTECH PURE* CL3 Wipers

- 100% continuous filament double-knit polyester wipers
- Recommended for ISO Class 3 or higher cleanrooms
- Patent-pending Clean-Dry Technology = Better surface wipe drying compared to other leading 100% polyester cleanroom wipers
- Absorbs liquids on contact
- Our lowest particle and extractables offering
- Four laser-sealed edges
- Solvent- and abrasion-resistant



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