

# Microscopic Analysis of Laundered Microfiber Mops & a Single-Use Microfiber Mop

Laboratory Report 105-S

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# **EXECUTIVE OVERVIEW:**

Eight laundered microfiber flat mops and one single-use microfiber flat mop were photographed at 20X's, 40X's using a 3D stereo microscope and 1,000X's using a Scanning Electronic Microscope, SEM.

The laundered mops demonstrated significant contamination and microfiber degradation. In some instances, the microfiber in no longer effective since it is shown to be completely melted and containing foreign material. The melted microfiber indicates that the drying process utilized by the laundries is too harsh and irreversibly damaging the microfiber. The process also isn't able to remove the obvious foreign material in addition to the chemical particulate accumulation.

These photographs support recent findings that the special laundry processes adopted for microfiber are not adequately removing gross soils and chemical build-up that have the potential to harbor microbiological pathogens.

<u>A new single-use microfiber provides the only assurance for a microfiber mop and wipe that can</u> guarantee the elimination of any gross particulate and chemical accumulation the could come off the substrate and/or result in potential cross-contamination.

## **BACKGROUND:**

Laundered microfiber mops that gained immediate acceptance and replaced string mops based on an EPA 2002 research demonstrating improvements in employee, patient, and environmental health. The laundered microfiber flat mop and tool techniques could reduce the risk of cross-contamination over the cumbersome conventional mopping techniques that required changing the cling solution after mopping every two or three rooms.

The study resulted in reduction of: 1) chemical use and disposal, 2) cleaning times for patient rooms and 3) custodial staff injuries and workers' compensation claims.

The original study didn't consider string mop contamination. However, the microfiber procedures effectively minimized those considerations. Recently the industry has demonstrated that single use items even for metal instruments were not effectively cleaned and were becoming a source for cross-contamination.

Microfiber is one of the most effective cleaning cloths for removal. The properties that make them so effective are the same ones that make them difficult to clean. Structural limitations of microfiber require laundering methods that are not as damaging as industrial washers and dryers. This means that there is the potential for residual soils and microbiological cross-contamination.

## **SCOPE:**

Provide photographic evaluations of a single-use microfiber mop and eight laundered healthcare microfiber that were returned to service.

# PHYSICAL AND MICROSCOPIC LABORATORY ANALYSIS PERFOMED BY <u>NORTH CAROLINA STATE UNIVERSITY SCHOOL OF TEXTILES</u>:

#### 1) Equipment

- a. Nikon SMZ-1000 Zoom Stereo Microscope at 20X's and 40X's power
- b. Phenom G1 SEM and Quorum Technologies SC7620 Mini Sputter Coater with a Gold/Palladium Target- SEM at 1000x Power
- 2) <u>Materials</u>
  - a. Eight Clean Laundered Microfiber Mops (#'s 1-6 & 8, 9)
  - b. One New Single-Use Microfiber Mop (#7)

#### **TEST PROCEDURE:**

University technician pictorially recorded the mops

#### **PHOTOGRAPHIC RESULTS:**



MOP 1

Mop 1 Cont'd - Stereo 3D-20X's















Mop 2 Cont'd - SEM



MOP 3



Mop 3 Cont'd - Stereo 3D-20X's







MOP 4



Stereo 3D-20X's





Mop 4 Cont'd - SEM



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MOP 5









MOP 6 Cont'd - SEM



**MOP 7 – SINGLE-USE MICROFIBER** 



# Mop 7 Cont'd - Stereo 3D-20X's



Stereo 3D-40X's





# MOP 8



Stereo 3D-40X's





#### MOP 8 Cont'd - SEM











MOP 9 Cont'd - SEM

