



Hygienically Clean Textiles

It is generally understood that proper laundering produces textiles that are considered "hygienically clean." There is no accepted definition within the laundry or healthcare industry as to what "hygienically clean" means, however, it is generally recognized that it means that the textile has been treated such that "bioburden" has been adequately removed so that the item can be used without fear of being a source of contamination in a healthcare use. And that the item can be treated with normal methods (steam sterilization) as needed to sterilize the textile. AAMI (Association for the Advancement of Medical Instrumentation) defines the term "hygienically clean" as "free of pathogens in sufficient numbers to cause human illness."

The wash process utilizes several techniques to assure that the bioburden is reduced or eliminated. These techniques include:

- a.) **Dilution:** Several water changes during the cleaning process physically remove and flush away bio-organisms. Mechanical action is also a factor to consider as bioburden is loosened from the fabric by proper mechanical action.
- b.) **Heat:** Washing at elevated temperatures (>140°F) deactivates much of the common bio-organisms.
- c.) **pH:** High pH (>10.5) will "attack" or deactivate bio-organisms. In addition, large swings in pH, from neutral (7.0 - 8.0) in first flushes to alkaline (10.5 - 11.5) during the main wash cycles to acid (5.5 - 6.5) will adversely affect bio-organisms.
- d.) **Oxidation:** This is where the chlorine bleach or oxygen bleaches contribute to the bio-organism deactivation. Chlorine bleaches are well known to have excellent anti-bacterial and anti-viral efficacy. Oxygen bleach is considered to be somewhat less aggressive on bacteria and viruses, however, when combined with the other cleaning factors in a laundry formula, oxygen bleach is considered effective in deactivating residual microbes.
- e.) **Drying:** Drying at temperatures that exceed 180°F on the fabric surface deactivate any potential remaining organisms.
- f.) **Chemical Sanitizers or Bacteriostats:** Some laundries as an extra precaution will use EPA registered products that will act as sanitizers in the final step of the laundry process. Gurtler markets Liquid Sentinel and Treatment 3093 for this purpose.

Published reports by NAILM (National Association of Institutional Laundry & Linen Management), TRSA (Textile Rental Service Association), CDC (Centers for Disease Control and Prevention) and AAMI indicate that a well designed wash formula that appropriately uses the above techniques will provide "hygienically clean" textiles.

Further, the Veteran's Administration sponsored a research study that investigated the effect of low temperature and chemical oxidation on the "hygienically clean" aspects of the laundering process used in their laundry facilities. This study is entitled "Killing of Fabric- Associated Bacteria in Hospital Laundry by Low Temperature Washing" (Blaser, et al., **Journal of Infectious Diseases**, Vol. 149, No. 1, Jan. 1984, 48-57). The article concluded that there was sufficient reduction of pathogenic bacteria, even in low temperature washing (22°C, 72°F). It also noted that even with the elimination of chlorine bleach, adequate reduction in pathogens was observed when compared to traditional high temperature (71°C, 160°F) washing processes.

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Steven J. Tinker
Director, Research & Development
Gurtler Industries, Inc.