Biotoxin Decontamination Protocol

Purpose & Scope

This protocol outlines the high-standard environmental cleaning procedures implemented by **Purified Environments** to reduce risks of exposure to **microbial contaminants and biotoxins**. *Biotoxins* are harmful biological substances—such as mold spores, mycotoxins, bacterial toxins, and fragments—that can trigger inflammation, immune reactions, and other health effects, especially in mold-sensitive or immune-compromised occupants. These occupants represent **upwards of 40% of the population** who are either genetically predisposed or allergically sensitized.

Implementation of this protocol is based on data and evidence confirming that the environment has a **biotoxin toxicity profile**, identified through baseline testing for molds, mycotoxins, beta-glucans (fungal cell wall components), actinobacteria, and endotoxins (bacterial toxins).

The current body of scientific evidence—supported by the CDC, EPA, NIH, and clinical research—confirms that mold-related contaminants such as spores, hyphal fragments, mycotoxins, and actinobacteria do not remain confined to visible mold growth areas. They migrate into dust, settle onto surfaces and fabrics, infiltrate HVAC systems, and persist in the indoor environment.

This scope applies to interior environments in residential and commercial properties treated for microbial contamination and does not include HVAC systems, which must be inspected and, if necessary, cleaned by a NADCA-certified HVAC cleaning company prior to these procedures.

WHY FULL ENVIRONMENTAL DECONTAMINATION IS NECESSARY

• CDC & EPA Guidance: Mold spores and fragments are airborne and settle throughout the environment. Cleaning "only visible mold" is insufficient if contamination is widespread.
• No Safe Exposure Standard: The EPA has no established safe level for airborne mold contaminants, meaning no exposure can be guaranteed safe for sensitized individuals.
• Medical Expert Consensus:
  - Dr. Andrew Heyman, MD, MPH (George Washington University): "Environmental decontamination is foundational. Even small re-exposures can undo months of treatment for CIRS."
  - Dr. David Ross, MD (Harvard-trained Neuropsychiatrist): "Mold and actinobacteria from water-damaged buildings cause identifiable brain injury visible on NeuroQuant MRI."

GUIDING PRINCIPLE

The objective is to remove as much biotoxin and polymicrobial material as humanly possible, acknowledging that a perfect (zero-microbial) environment does not exist. This process follows ISO 14644-13:2017 cleanroom decontamination standards, adapted for whole-building biotoxin remediation — aligning remediation practices with medical science.

CORE DECONTAMINATION PROCESS

Biotoxin decontamination requires:
1. Comprehensive HEPA Vacuuming of all surfaces and contents.
2. Manual Sanitization and Cleaning using approved cleaning and disinfecting agents.
3. Final Dry Wipe-Down to remove any residual particulate matter.

METHODOLOGY

• Cleaning Direction: Always from the cleanest area to the dirtiest, and from top to bottom.
• Surface Coverage: All ceilings, walls, floors, furniture, fixtures, cabinetry, shelving, and contents are addressed.
• Tools & Materials:
  - High-quality true HEPA filtration vacuums
  - Low-lint synthetic microfiber cleaning tools
  - IPA pre-saturated wipes with proper fold sequence and replacement frequency
• Cross-Contamination Prevention:
  - Dedicated cleaning tools for walls/ceilings vs. floors
  - Buckets must be heavy-duty plastic and metal-free
  - Equipment is dedicated to the specific environment being cleaned

TECHNICIAN PPE REQUIREMENTS

All personnel must wear:
- Disposable gloves
- Lint-free shoe covers
- Bouffant caps
- Surgical masks or respirators (as required)
- Safety glasses
- Gowns or frocks
- Beard covers (if applicable)

STEP-BY-STEP CLEANING SEQUENCE

1. HEPA Vacuum all surfaces and contents.
2. Wet Wipe non-porous surfaces using approved cleaning and disinfecting agents to capture fine particulate matter.
3. Dry Wipe all previously damp-wiped areas.
4. Content Handling: Every item — including books, decorative objects, and stored contents — is cleaned using the same HEPA / wet wipe / dry wipe sequence.
5. Waste Handling: Empty waste receptacles, clean receptacle surfaces, and replace liners.

Outcome Goal

To deliver a **reduced-risk, medically sound indoor environment** that measurably lowers biotoxin exposure. From a clinical perspective, reducing ongoing exposure supports the body's ability to recover, making improved tolerance and recovery from biotoxin-associated illnesses **more possible**. The goal is not to create a "perfect" environment, but to achieve one in which occupants can live, work, and rest with a significantly lowered risk of exposure-related health effects.

***Footnote:**

ISO 14644-13:2017 is an international cleanroom standard that specifies methods for cleaning surfaces to achieve defined levels of cleanliness, both for microscopic particles and chemical residues. Originally developed for industries like pharmaceuticals, aerospace, and microelectronics—where even trace contamination can cause harm—its cleaning principles are applied here to whole-building biotoxin remediation to ensure the highest achievable environmental cleanliness.

ISO = International Organization for Standardization
14644 = The set of standards specifically for clean rooms and controlled environments
Part 13 (2017 edition) = *Cleaning of surfaces to achieve defined levels of cleanliness in terms of particle and chemical classifications*
ISO 14644-13:2017 provides **methods and best practices for cleaning surfaces in cleanrooms** so they meet **specific cleanliness requirements**—both in terms of **particles** (like dust, debris, microbes) and **chemical residues**. It covers:

Cleaning **techniques** (wiping, vacuuming, mopping)
Sequence and direction of cleaning (cleanest to dirtiest, top to bottom)
Approved **equipment and materials**
Verification methods (particle counts, surface residue testing)
It's most often applied in **pharmaceutical manufacturing, semiconductor production, biotechnology labs, aerospace assembly**, and other environments where even tiny contaminants can cause major problems.