

# CULTURABLES - GUIDELINES FOR INDOOR MICROBIAL CONTAMINATION

Currently there are no numeric standards for airborne or surface microbial contamination indoors. Suggested guidelines are constantly being reviewed and edited as more information surrounding microbial IAQ issues surface. Some common denominators should be considered when interpreting results:

1. Comparison of indoor/outdoor concentration ratios.
2. Complaint vs. non-complaint areas or affected vs. non-affected areas.
3. Consider air exchange rates and activity levels in a building structure, weather, and season of the year.
4. Rank order assessment and concentration (e.g. CFU/m<sup>3</sup> or Spores/m<sup>3</sup> of air) of the microbe.
5. Predominant fungal genera / Opportunistic, Pathogenic or water indicator organisms such as but not limited to: *Chaetomium*, *Stachybotrys*, *Rhodotorula*, *Trichoderma* and *Scopulariopsis*.
6. Generally fungal counts indoors should be lower than outdoor counts; however, there is always a potential bias from infiltration of outdoor air, poor housekeeping, excessive indoor relative humidity or potential contamination sources (e.g. water intrusion thru a basement wall).

These guidelines are intended to be a “reactionary threshold” to incite further investigation. They are not intended for use of health significance nor are they necessarily representative of unacceptable indoor environments.<sup>‡</sup>

TYPE OF SAMPLE	LOW LEVELS OF FUNGAL CONTAMINATION	ELEVATED LEVELS OF FUNGAL CONTAMINATION
<sup>†</sup> Culturable Bioaerosol Samples	< 250 CFU/m <sup>3</sup> of air	> 1,000 CFU/m <sup>3</sup> of air
<sup>†</sup> Bulk Samples	< 25,000 CFU/gram of material	> 1 x 10 <sup>6</sup> CFU/gram of material
<sup>€</sup> Carpet Vac – Dust	< 5,000 CFU/ft <sup>2</sup>	> 75,000 CFU/ft <sup>2</sup>
<sup>°</sup> Contact Agar Plates	< 50 CFU/plate	> 50 CFU/plate

## \*SWAB GUIDELINES

BACTERIA	FUNGI	CONTAMINATION
< 10,000 CFU/in <sup>2</sup>	< 10,000 CFU/in <sup>2</sup>	Low Contamination
10,000 – 100,000 CFU/in <sup>2</sup>	10,000 – 100,000 CFU/in <sup>2</sup>	Moderate Contamination
> 100,000 CFU/in <sup>2</sup>	> 100,000 CFU/in <sup>2</sup>	Elevated Contamination

## REFERENCES

<sup>‡</sup> *Recommended Guidelines for Indoor Environments*, Indoor Air Quality Association, Inc., 10400 Connecticut Avenue, Suite 510, Kensington, MD 20895, IAQA 01-2000.

<sup>†</sup> Rao, C., Burge, H., and Chang, J., “Review of Quantitative Standards and Guidelines for Fungi in Indoor Air”. *Journal of the Air and Waste Management Association*, 1996; 46: 899-908.

<sup>€</sup>Tiffany, J., Bader, H., *Industrial Hygiene and Clearance Considerations for a Microbial Remediation Project*, Tiffany Bader Environmental, Inc., 355 Long Lane, Bedminster, NJ, 07921.

\*Clark, G., “Assessment and Sampling Approaches for Indoor Microbiological Assessments”, *The Synergist*, November 2001.