

## ERMI - The Environmental Relative Moldiness Index

### What is ERMI?

ERMI is the Environmental Relative Moldiness Index – the combination of EPA research, powerful PCR technology, and a new method to screen homes for mold.

- The **ERMI** is an acronym for **E**nvironmental **R**elative **M**oldiness **I**ndex.
- It was developed by scientists at the USEPA to provide a straightforward, objective, and standardized way to obtain results for indoor air quality investigations.
- The EPA is developing an ERMI ranking system based on dust samples collected from homes across the U.S.
- The ERMI will help predict the moldiness of homes. Homes with high ERMI values have a greater chance of having a mold problem than homes with a low ERMI.
- 36 different fungi make up the ERMI and are designated as Group I (those found in atypical, water damaged homes) and Group II (those commonly found in all homes):

**Group I** - *Stachybotrys chartarum*, *Chaetomium globosum*, *Cladosporium sphaerospermum*, *Aspergillus versicolor*, *Eurotium* (A.) *amstalodami*, *Penicillium variable*, *Aspergillus flavus*, *Aspergillus restrictus*, *Penicillium crustosum*, *Penicillium chrysogenum*, *Aspergillus niger*, *Aspergillus sclerotiorum*, *Penicillium purpurogenum*, *Aspergillus fumigatus*, *Penicillium corylophilum*, *Aureobasidium pullulans*, *Aspergillus ochraceus*, *Penicillium brevicompactum*, *Paecilomyces variotii*, *Aspergillus sydowii*, *Penicillium spinulosum*, *Wallemia sebi*, *Aspergillus unguis*, *Scopulariopsis brevicaulis*, *Scopulariopsis chartarum*, *Aspergillus penicillioides*, *Trichoderma viride*

**Group II** - *Acremonium strictum*, *Alternaria alternata*, *Aspergillus ustus*, *Cladosporium cladosporioides* v1, *Cladosporium cladosporioides* v2, *Cladosporium herbarum*, *Epicoccum nigrum*, *Mucor* & *Rhizopus* group, *Penicillium chrysogenum*, *Rhizopus stolonifer*

### What is MSQPCR?

- **MSQPCR** is an acronym for **M**old **S**pecific **Q**uantitative **P**olymerase **C**hain **R**eaction.
- The ERMI value is determined using the MSQPCR method in the lab.
- It was developed by scientists at the USEPA to detect and quantify fungi associated with indoor air quality problems.
- It's a **FAST, ACCURATE, and SENSITIVE** DNA-based analytical method for identifying and quantifying molds to the species level.
- The method looks for the presence of DNA sequences that are unique to a particular mold species.

Based on recently published data from EPA researchers and the 2006 HUD American Healthy Home Survey, the test has been developed as a tool to evaluate the potential risk of indoor mold growth and associated health effects.

### How does it work?

The test involves the analysis of a single sample of dust from a home. The sample is analyzed using mold-specific quantitative polymerase chain reaction (MSQPCR), a highly specific DNA-based method for quantifying mold species. A simple algorithm is used to calculate a ratio of water damage-related species to common indoor molds and the resulting score is called the Environmental Relative Moldiness Index or ERMI. The ERMI value is typically between -10 and 20.

In order to most effectively use this new tool, the ERMI must be compared to a national database. Indices were determined using this method for 1,096 homes across the U.S. as part of the 2006 HUD American Healthy Home Survey. Individual indices, ranked from lowest to highest were used to create a national Relative Moldiness Index (RMI) Scale.

### How was it developed?

In initial studies by the EPA, the concentrations of different mold species in “moldy homes” (homes with visible mold growth or a history of water damage) and “reference homes” (homes with no visible mold) were compared. Based on those results, mold species were selected and grouped into those with higher concentrations in moldy homes (group1) and those with lower concentrations (group2). For the calculation of the ERMI, all concentrations are log-transformed and the sum of group 2 is subtracted from the sum of group 1.

### What are the advantages?

In addition to the simplicity of taking only one sample, the ERMI offers several advantages over traditional mold screening methods. Carpet dust acts as a reservoir for mold spores and is more representative of mold levels over time versus short term air samples. The use of MSQPCR for this test allows for increased precision as it is based on a biochemical assay using calibrated instrumentation. Further research is being conducted and published that will link the ERMI assessing health risks for susceptible individuals. This information along with the national database will be invaluable in providing an objective and standardized method for screening homes for mold.

### National Relative Moldiness Index Values

