

S-520 mold remediation standard

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ABSTRACT

‘Standard and Reference Guide for Mold Remediation’ (IICRC S520) is the culmination of a 3-year development effort coordinated by the Institute of Inspection, Cleaning and Restoration Certification and seven other organizations ranging from the Association of Specialists in Cleaning and Restoration (ASCR) to the Indoor Air Quality Association (IAQA). The paper provides an overview of both the Standard and the Reference Guide that accompanies the Standard. The document was written primarily for technicians who remediate mold damage and secondarily for others who investigate, write remediation specifications or perform remediation investigations. A major focus of the paper is topics covered in the standard that caused great discussion and debate during the preparation of the document and will continue to be of interest and discussion for the remediation industry in the future. This will be the first look at a new and important indoor environmental industry milestone.

INDEX TERMS

Microbial contamination; Mould (Mold); Remediation; Cleaning; Water damage

BACKGROUND

For the past several years, there has been an active debate about standards for the various aspects of indoor environmental quality. On the one hand, most of us share a feeling that completed research into the indoor environment is far from adequate to start setting standards. We have not even devised a definition of a ‘normal’ environment that we all agree on, much less figured out how those conditions can be best achieved or what methods can be consistently utilized to measure their attainment.

For example, test methods are a continuing subject of study and debate. Although many methods have been developed that collect data on various dimensions of indoor environments, it is generally agreed that any such data collected must be analyzed and interpreted by individuals with extensive knowledge and long experience. Even then, the opinions provided are open to error. Coupled with this complexity is the significant variation from individual to individual in response to indoor environmental conditions. What may be held to be a comfortable environment for one individual may be totally intolerable for another. Ultimately, the response of the occupants of a given space is the only criteria that can differentiate a normal (or acceptable) space from a problem space.

Especially problematic is the biological characterization of indoor spaces. The measurement and reporting of levels of bacteria and fungi and/or their spores as well as emissions and decay products resulting from the growth of such organisms utilizes a wide variety of methods and techniques. New methods such as the measurement and characterization of the release of microbial associated volatile organic compounds are very much in the developmental stage. Other methods such as viable and non-viable air sampling, although in common and widespread use for years, are acknowledged to include significant risk of error. It is common for prudent investigators to utilize multiple methodologies, collect many samples and carefully interpret the data obtained.

Even though the above limitations are widely recognized, there has been significant demand for greater uniformity in approaches to describing what is an acceptable level of indoor environmental quality and making the needed changes to achieve such a condition. The pressure has been especially intense in the United States as related to concerns about excessive levels of fungal biomass in building interiors. Much of this pressure has been generated by media reports of high profile events related to public buildings such as courthouses and schools. In addition, litigation

over perceived indoor environment related health conditions and property damage have grown exponentially in recent years.

During the summer of 2001, flooding throughout the Midwestern US and in Texas and Louisiana resulted in an avalanche of insurance claims for property damage. Much of the damage was alleged to be from mold growth (often sensationalized as ‘toxic mold’) and many contractors and property owners insisted on complex and expensive procedures to correct the damage and restore the property. The number and size of insurance claims generated during this period led to a crisis in the affected areas that quickly spread to other states and soon included claims for all manner of ‘mold problems’ from a variety of causes. Insurance companies acted to contain their exposure by dropping or limiting coverage. Concerned citizens called for some kind of action.

Congressman Conyers (D-MI) introduced HR1268 (Toxic Mold Safety and Protection Act) in the US House of Representatives in 2002 and again in 2003. This bill known as the Melina Bill (after the name of the daughter of a staff member in the congressman’s office who was alleged to have acquired a health condition related to mold in her home) focused more attention on the issue. Although this bill did not gain wide support, it served to expand the impression that something must be done. Adding to the pressure for action were claims that many of the ‘mold remediation projects’ done in 2001 were not necessary, over priced and/or incompetently executed. The result of all of this was a public outcry for legislation to ‘address the problem’. The majority of states had legislation in play during 2003 related to IAQ and mold. This included 28 states with a total of 87 pieces of legislation:

- 12 states had legislation specific to IAQ and schools.
- 10 states had legislation addressing IAQ in public buildings, often including schools. (This does not include bills specific to tobacco smoke.)
- 20 states had active mold bills in 2003.
- Multiple bills introduced in eight states (FL, LA, MI, NJ, NY, PA, TN, TX).
- Regulation of remediation proposed in eight states (AZ, CA, FL, LA, NJ, NV, NY, TX).

A new law was passed in 2003 in Texas:

- HB329 passed and was signed into law.
- Mandates regulation of mold assessment and remediation:
 - ✦ licensure of mold assessors and remediators;
 - ✦ accreditation of training providers;
 - ✦ state examinations, qualifications, fees.
- Prescribes process for assessment and remediation.
- Establishes clearance criteria for completed remediation work.

Activity is expected to greatly expand during the next year as the regulations implementing the Texas law are finalized and placed into effect. Early indications include the following:

- Louisiana is heating up on regulating remediation.
- Washington DC has draft rules and will soon be ready to regulate.
- Hawaii is looking at 2004 as the year.

INTRODUCTION—THE S-520 PROJECT

In 2001, members of various organizations involved with providing services related to the indoor environment became concerned about the growing need for uniformity and initiated a project to

develop an industry consensus standard to dealing with mold contamination in buildings. They describe their work as follows:

“This document is the result of a collaborative effort primarily involving industry experts, companies, training schools, industry trade associations, government and educational institutions, institutes and professional societies. The three principal designers of the document include:

- Institute of Inspection, Cleaning and Restoration Certification (IICRC)
- Indoor Air Quality Association (IAQA)
- Indoor Environmental Institute (IEI)

Other organizations contributing to the creation of this document include the American Indoor Air Quality Council (AmIAQ), the Association of Specialists in Cleaning and Restoration (ASCR, International), the International Society of Cleaning Technicians (ISCT) and the National Air Duct Cleaners Association (NADCA). The publication of this document was made possible through the boundless contributions of a dedicated group of experts. The IICRC Board of Directors and the Standards Committee members genuinely appreciate the time and effort contributed by these individuals. They exhibit the true volunteer spirit that has been the driving force behind the IICRC since its inception.”ⁱ

The document is designed to set the standard of care for remediation contractors. The committee and other contributors represent a broad section of individuals from industry, consulting firms, law, academia and science. However, the prime criteria for selection of contributors were knowledge of the processes and willingness to submit to the ambitious schedule that the group imposed for completion of the document. The core working committee consisted of 33 individuals. An additional 40 persons are listed as contributors and over 250 participated in the initial peer review.

The membership of the main committee with one exception was composed entirely of US residents so the document strongly reflects terminology and practices common in the United States. At the same time, the primary sponsoring organization, the IICRC, is owned by trade groups from throughout the world and every effort possible was made to produce a document that can easily be adapted to incorporate national and regional needs.

The publication will actually consist of two documents. The first is the Standard, which defines the ‘state of the art’ and, “... describes the procedures to be followed and the precautions to be taken when assessing moisture intrusion and performing mold remediation in residential, institutional and commercial buildings. The standard defines mold remediation techniques, the principles of which may apply to other microbial remediation projects or services.”ⁱⁱ The second is a reference guide that expands on and explains the concepts introduced in the standard.

In addition to the main committee that discussed and voted on the contents of each section, the group was broken up into a series of sub committees. One committee was charged with drafting a chapter of the reference guide (and the corresponding Standard language) and presenting that content to the main committee. Issues that could not be resolved by the main committee were referred back to the various sub-committees for additional research and study. The smaller working groups were tasked with identifying research or source documents relating to the points at issue.

CRITICAL DEFINITIONS

The key to the S-520 standard is a series of definitions that guided the deliberations of the committees. The first set of these dealt with the force of the recommendations set forth in the documents. The committee settled on three levels of importance that are explained at the very beginning of the document:

“IMPORTANT DEFINITIONS

Throughout this document the terms “must”, “highly recommend(ed)” and “recommend(ed)” are used to compare and contrast the different levels of importance attached to certain practices. It is impractical to issue blanket rules intended to apply to every mold remediation situation. In extenuating circumstances,

deviation from portions of this standard may be appropriate. Carelessness is never acceptable and common sense should prevail in all cases.

- **must:** when the term *must* is used in this document, it means that the practice or procedure is mandatory due to natural law or regulatory requirements, including occupational, public health and other relevant regulations, and is therefore a component of the accepted 'standard of care' to be followed.
- **highly recommended:** when the term *highly recommended* is used in this document, it means that the practice or procedure is a component of the accepted 'standard of care' to be followed, while not mandatory by regulatory requirement.
- **recommended:** when the term *recommended* is used in this document, it means that the practice or procedure is advised or suggested.

The IICRC S520 Standard Committee interprets the 'standard of care' to be: practices that are common to reasonably prudent members of the trade who are recognized in the industry as qualified and competent."ⁱⁱⁱ

Part 3 of the Standard contains additional definitions, a commonly held view of which is necessary to clear understanding and interpretation of the standard and its meaning. Less critical terms are defined in an extensive glossary at the end of the document. The definitions that were the target of the most intensive and prolonged debate were those that dealt with the 'condition' on interior spaces. These definitions are key to determining when remediation is required, what level of intensity the remediation project demands and when remediation is satisfactorily completed. It is these definitions that will receive ongoing discussion and be the object of both support and controversy. These definitions addressed the most often raised question in discussions of indoor environmental quality, 'How clean is clean enough?':

"Condition:

for the purpose of this standard, Condition levels (1, 2, and 3) are defined for indoor environments contaminated with mold. Definitions for each Condition are provided here.

Condition 1—

an indoor environment that may have settled spores, fungal fragments or traces of actual growth whose identity, location and quantity is reflective of a normal fungal ecology for an indoor environment.

Condition 2:

an indoor environment having secondary contamination from settled spores that were dispersed directly or indirectly from, and reflective of, the fungal ecology of a Condition 3 area. A Condition 2 area may have some actual growth that is of insufficient quantity to be considered contaminated to a Condition 3 status. Where building materials and contents are adjacent to or in the immediate proximity of actual growth, and where the concentration of settled spores is such that surface cleaning procedures typically recommended for Condition 2 are not effective, it may be necessary to remediate the item(s) in the manner described herein for the Condition 3 contamination level.

Condition 3:

an indoor environment contaminated with the presence of actual mold growth and associated spores. Actual growth includes growth that is active or inactive, visible or hidden."^{iv}

The greatest question posed by the above definitions is, 'How do you tell the difference between the three condition levels?' or stated in another way, 'Who makes the determination of condition?' The document deals with this burning question in two ways:

1. Part 3 contains the following definition: Indoor Environmental Professional (IEP):
"as defined in this standard, an IEP is an individual that is qualified by education, training and experience to perform an assessment of the fungal ecology of property, systems and contents at the job site, create a sampling strategy, sample the indoor environment, interpret laboratory data and determine Condition 1, 2 and 3 status for the purpose of establishing a scope of work and verifying the return of the fungal ecology to a Condition 1 status."^v
2. The reference guide includes an entire chapter (12) explaining in depth the qualifications and role of the IEP.

Early on in the process, the committee agreed that the level of current indoor environmental science is insufficient to easily define a satisfactory set of indoor conditions that will achieve broad acceptance as being 'normal'. Rather, they decided to assign that task to a well-trained and

highly experienced individual who would be independent of the person or persons doing the remediation. The standard anticipates that same individual will be involved throughout the remediation project from establishing the scope of work up front through to providing clearance by certifying that the space has been returned to a ‘Condition 1’ status.

The IEP is given great latitude in carrying out his or her duties and discharging this central responsibility. This at the same time recognizes that the science of indoor condition assessment has not reached maturity yet provides for the possibility that adequate tools or methods may be developed at any time.

THE DETAILS

The S-520 documents represent the distillation and compilation of a massive amount of research, published material and decades of individual experience on the part of the contributors. The reference guide contains rich detail that will serve as an educational resource as well as reference for both practitioners and others impacted by mold in indoor spaces. The final document will exceed 100 pages and cover a broad assortment of topics as can be seen by a casual scan of the contents:

Table of Contents

Introduction.....1

Chapter 1—Fungal Ecology2

Chapter 2—Principles of Mold Remediation.....6

Chapter 3—Health Effects from Indoor Mold Contamination.....9

Chapter 4—Administrative Procedures and Insurance21

Chapter 5—Limitations, Complexities, Complications and Conflicts.....28

Chapter 6—Inspection and Preliminary Determination31

Chapter 7—Structural Remediation36

Chapter 8—HVAC51

Chapter 9—Contents Remediation56

Chapter 10—Tools and Equipment.....70

Chapter 11—Health and Safety.....87

Chapter 12—Indoor Environmental Professionals101

Appendix

A-1—Mold Remediation Certification Authorities.....A-1

A-2—Suggested Guidance for the Selection and Use
of Respiratory Protection During Mold RemediationA-3

Industry AcronymsG-1

Glossary.....G-2

Source AcknowledgementsS-1

For the first time, all of these subjects have been brought together in one document. Much has been adapted from the source documents to conform to the special conditions related to the remediation of mold. This alone will be of great benefit. Hopefully, this will serve to raise mold remediation to a new level of professionalism. At a minimum, it will be a useful reference.

WHERE TO FROM HERE?

The sponsoring organizations and the committee and contributors are not under the illusion that all who read it will embrace the document. In fact, the committee faced significant difficulty in moving to consensus time after time during the creation of the documents. In fact, much of the purpose behind publication of the standard is to initiate further research study and dialogue that will take the industry to the next level. This hope is clearly set forth in the introduction to the reference guide: “*IICRC S520 is a living document. It will be evaluated and updated on an on-*

going basis as scientific and industry knowledge and experience in processing mold-contamination situations change or increase.”

(Note: This paper was submitted prior to the completion of the public review process for the Standard. The various statements, quotations and references are consistent with the public review version of the document released August 15, 2003. It is anticipated that there may be minor changes or revisions to the document as a result of the various peer and public reviews. The conference presentation will incorporate all such changes and revisions. In addition, a corrected copy of this document detailing any changes will be submitted to the secretariat as soon as the document is released for publication.)

ⁱ IICRC Mold Remediation Standard (IICRC S520) August 15, 2003 (draft), Page 1

ⁱⁱ S-520, P 16 (Scope)

ⁱⁱⁱ S-520, P 2

^{iv} S-520, P 17

^v S-520, P 18