Body of Knowledge

Indoor Air Quality Practitioner

AIHA®
Protecting Worker Health

Indoor Air Quality
ASSOCIATION INC.

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About AIHA®

Founded in 1939, the American Industrial Hygiene Association® (AIHA®) is one of the largest international associations serving the needs of industrial / occupational hygiene professionals practicing in industry, government, labor, academic institutions, and independent organizations.

For more information, visit **www.AIHA.org**

About IAQA

The Indoor Air Quality Association (IAQA) is a nonprofit organization dedicated to bringing practitioners together to prevent and solve indoor environmental problems for the benefit of customers and the public. IAQA was established in 1995 and is the nation's largest indoor air quality trade association, with over 2,600 members and more than 20 local chapters across the United States and Canada.

For more information, visit **www.IAQA.org**

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Background

AIHA® and IAQA worked collaboratively to develop the technical framework, known as the Body of Knowledge (BoK), that outlines the knowledge and skills a competent person should possess and be able to demonstrate in the area of indoor air quality assessments. In July 2013, a panel of subject matter experts was appointed to develop a BoK and subsequent job / task analysis survey to collect input, perspective, and feedback from relevant stakeholders to identify the essential knowledge and skills required for IAQ practice.

In October 2014, the job / task analysis survey was made available to external stakeholders, allied professionals and AIHA® and IAQA members and volunteers. The survey results were used to finalize the content for the IAQ Practitioner BoK.

The Body of Knowledge document was approved by the IAQA and the AIHA® Boards of Directors in March 2015 and April 2015, respectively.

Indoor Air Quality Practitioner

Occupational Definition:

This document provides an organized summary of the collective knowledge and skills necessary for competent indoor air quality practice and covers a broad set of agents, building systems and related issues pertaining to indoor air quality. Different industries and monitoring scenarios may require different applications of the skill sets. This Body of Knowledge (BoK) will be used by AIHA® and IAQA to establish a framework for the development of training programs, knowledge / skill assessment tools, and for the improvement of the state of professional IAQ practice.

This BoK is not intended to define or stipulate employer hiring criteria. It is the employer's responsibility to ensure that each employee understands his or her specific job and has met the minimum criteria established by relevant regulations, standards, and the specific industry, facility, or project.

1.0 General Knowledge

1.1. Apply knowledge of general concepts in Biology, Chemistry, Physics, Microbiology and Mathematics, as they relate to the practice of indoor air quality.

1.2. Demonstrate an understanding of the definition of good indoor air quality.

2.0 Contaminants and Stressors

2.1. Identify sources and pathways of common contaminants:

- Bioaerosols (mold, bacteria, allergens, etc.)
- Gases (radon, volatile organic compounds (VOCs), carbon monoxide (CO_1), carbon dioxide (CO_2), combustion gases, etc.)
- Particles (particulate matter, asbestos, lead, etc.)

2.2. Identify sources and pathways of common physical stressors (noise, vibration, lighting, thermal comfort, ergonomics, etc.).

2.3. Recognize psychosocial factors (management and employee relationships, employer / employee relations, employee to customer relationships and environmental changes, etc.) and the need for other specialized evaluation when encountered.

3.0 | Health Effects

3.1. Identify the broader occupant symptom patterns (as well as the role of medical professionals in diagnosis) and understand how they may impact resolution of the indoor air quality issue (sick building syndrome [SBS], mass psychogenic illness [MPI], building related illness [BRI], etc.).

3.2. Demonstrate an awareness and understanding of the common BRIs and the need for diagnosis by medical professionals.

3.3. Demonstrate an understanding of the concept of SBS and challenges associated with the ambiguous nature of SBS.

3.4. Demonstrate an understanding of the concept of MPI and the need for other professionals to address issues associated with MPI.

3.5. Demonstrate an understanding of the health effects (specific and nonspecific) commonly encountered in indoor air quality incidents and the potential causes in the environment.

3.6. Demonstrate an understanding of practitioner limitations and the need for diagnosis to be conducted by medical professionals.

4.0 | Buildings and Building Systems

4.A | *Building Science*

4.A.1. Assess the impact of building materials on indoor air quality.

4.A.2. Identify the common types of enclosure components and assemblies and their impact on indoor air quality.

4.A.3. Identify the building enclosure (roof, walls, floors, etc.).

4.A.4. Identify the core concepts of moisture movement through the building enclosure:

- Drainage plane
- Air barrier
- Vapor retarder
- Water infiltration
- Air infiltration/exfiltration
- Vapor diffusion
- Plane of condensation
- Water vapor permeability
- Climate

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4.0 | Buildings and Building Systems

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4.B | *Heating, Ventilating and Air Conditioning (HVAC)*

4.B.1. Demonstrate an understanding of the role of heating, ventilating and air conditioning (HVAC) systems in an indoor air quality investigation and how HVAC design factors may adversely impact indoor air quality.

4.B.2. Demonstrate an understanding of the fundamentals of a typical HVAC system (generation equipment, distribution system, terminal equipment, applicable standards, outdoor air volumes, exhaust / intake relationships, ventilation rates, re-circulation, filtration, barriers, etc.).

4.B.3. Identify the common components of an HVAC system and how the equipment works together as a system (logic, design, etc.).

4.B.4. Demonstrate an understanding of the role and importance of how different spaces are used in the building, their interactions, and potential impact on indoor air quality concerns.

4.B.5. Demonstrate an understanding of the different types of ventilation (natural, mechanical, etc.), how to measure the ventilation, and ascertain the suitability of the ventilation.

4.B.6. Demonstrate an understanding of different air distribution systems, controls of the distribution systems (automation, sensors, etc.), and how they affect air delivery to the occupant space.

4.B.7. Conduct a visual inspection of filter assemblies.

4.B.8. Demonstrate an understanding of different filter efficiency scales, efficiency standards, types of filter categories, and how filtration impacts performance of the HVAC system.

4.B.9. Assess the impact of dew point temperature and surface temperatures in the space.

4.B.10. Assess pressure differences using measurement techniques.

4.B.11. Assess the impact of pressure differences on contaminant movement through the building (including moisture).

4.B.12. Demonstrate an understanding of how stack effect, wind pressure, and pressure due to mechanical equipment impact air movement.

4.B.13. Demonstrate an understanding of how energy savings strategies can impact indoor air quality.

4.B.14. Demonstrate an understanding of the HVAC system's impact on humidity control.

4.B.15. Recognize when outside HVAC / engineering expertise is warranted.

5.0 | Assessments

5.A | *Scoping*

5.A.1. Identify the scope of an indoor air quality problem in terms of physical areas, people, timeframes and budget, in order to appropriately focus investigative actions.

5.B | *History*

5.B.1. Demonstrate the importance of collecting a building and occupant history; depending on the situation this may include, but not be limited to, location / setting, construction / renovation dates, previous land use, management structure, building and HVAC design / operation / maintenance records (blueprint / as-built review, etc.), occupant surveys / interviews and prior sampling and investigation data.

5.C | *Data Gathering*

5.C.1. Identify the components of an indoor air quality investigation, such as the collection of multiple data points including identifying the scope of the problem, collecting building and occupant history, walkthrough inspection observations, and potential environmental sampling.

5.C.2. Conduct an effective interview, extract valuable information, and avoid pitfalls in the interview process.

5.D | *Scientific Method*

5.D.1. Apply the scientific method to indoor air quality investigations.

5.D.2. Develop hypotheses around the potential causes of indoor air quality concerns, collect and evaluate data to test these hypotheses, and reach conclusions accepting or rejecting the hypotheses.

5.D.3. Apply critical thinking skills to differentiate between simple and complex indoor air quality concerns.

5.D.4. Demonstrate an understanding that hypotheses development begins before the initial walk-through and continues until resolution of the issue.

5.D.5. Recognize that, in some cases, simple solutions may be effective and should be a priority when developing recommendations.

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5.0 | Assessments

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5.E | *Walkthrough Inspection*

5.E.1. Demonstrate an understanding of the walkthrough inspection for fostering occupant communication and data collection.

5.E.2. Understand that the walkthrough inspection includes the area of concern, adjacent areas, and related building enclosure and HVAC systems.

5.E.3. Recognize common contaminant sources, pathways, and other problematic conditions in the field.

5.E.4. Identify what types of preliminary environmental measurements may be appropriate for an initial walkthrough.

5.F | *Sampling*

5.F.1. Demonstrate the importance of evaluating the need and purpose of a clearly defined and communicated sampling plan prior to collection.

5.F.2. Demonstrate an understanding of background levels of contaminants and generally accepted exposure guidelines for indoor environments.

5.F.3. Demonstrate an understanding of how to select the most appropriate instruments and how data will be interpreted prior to collection.

5.F.4. Sample, analyze and interpret results related to common indoor air quality contaminants and conditions.

5.G | *Limitations*

5.G.1. Demonstrate an understanding of practitioner limitations and when additional expertise is necessary (HVAC engineers, medical professionals, architects, etc.).

5.H | *Corrective Actions*

5.H.1. Recognize conditions that may require immediate emergency action relative to a building or individual occupants.

5.H.2. Demonstrate an awareness of when there is a need for immediate and / or long term action plans (including follow-up assessments).

5.H.3. Perform corrective actions for common IAQ problems (remove, substitute, replace, etc.).

5.I | *Communication*

5.I.1. Demonstrate an understanding of the fundamentals of risk communication and methods of conflict resolution when interacting with stakeholder groups.

5.I.2. Demonstrate the importance of effectively communicating information to the client and / or other stakeholders (scope, observations, verified / unverified information, hypotheses, testing plans, findings, assumptions, uncertainties, conclusions, recommendations, references, etc.).

6.0 | Mitigation of Indoor Air Quality Problems

6.1. Recognize the wide variety of indoor environmental concerns / problems (asbestos, radon, water intrusion, mold growth, VOC offgassing, etc.).

6.2. Recognize and distinguish between human-related and building-related problems.

6.3. Identify appropriate responses and include them in the mitigation plan.

6.4. Identify commonly used containment equipment and engineering controls.

6.5. Identify commonly used personal protective equipment (PPE).

6.6. Design a mitigation plan and determine what success looks like.

6.7. Coordinate subcontractors during mitigation.

6.8. Demonstrate the importance of effective communication that includes all stakeholders throughout the process.

7.0 Proactive Approaches to Indoor Air Quality

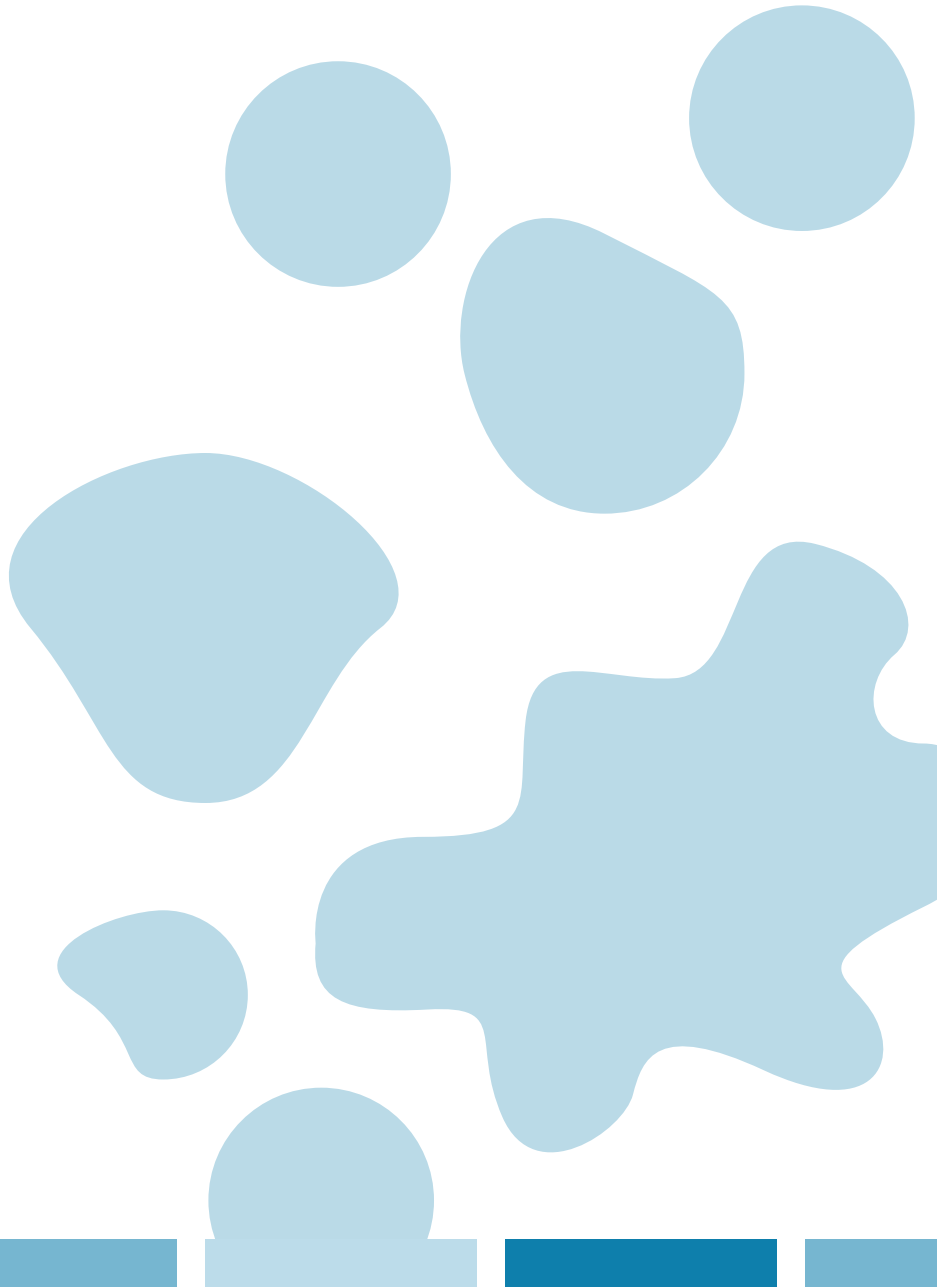
7.1. Apply proactive methods for handling indoor air quality, including source reduction, adequate outdoor air ventilation and air cleaning.

7.2. Assess the potential life cycle impact of proactive approaches.

7.3. Assess the impact of the interaction between the building enclosure and HVAC system, as well as the impact of those individual systems, in the prevention of indoor air quality problems.

7.4. Demonstrate the importance of proactive cleaning and pest management processes for satisfactory indoor air quality in occupied buildings.

7.5. Demonstrate an understanding of, and the ability to communicate, the cost impacts of different recommendations.



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American Industrial Hygiene Association
3141 Fairview Park Dr. Suite 777 • Falls Church, VA 22042
www.aiha.org

Indoor Air Quality Association
1791 Tullie Cir NE • Atlanta, GA 30329
www.iaqa.org