CIH® EXAM BLUEPRINT

Based on the 2014 Job Analysis
(Effective April 1, 2015)

The test specifications below identify three domains of performance and nine tasks. A domain is a major area of responsibility that defines the role of a Certified Industrial Hygienist® (CIH®) practitioner. A task is an activity performed within a performance domain. Knowledge and skills candidates should possess in order to perform the tasks are also included.

Domain I: Exposure Assessment Principles and Practice
50%

Task 1. Anticipate and recognize potential health hazards by studying environments, tasks, and people to identify risks associated with stressors, products, and processes.

Knowledge of:

1. Basic math and sciences
2. Biological/chemical/physical/ergonomic hazards
3. Industry, including raw materials, intermediates, final products, and waste streams
4. Process (unit operations) knowledge
5. Toxicology
6. Standards and guidelines
7. Epidemiology
8. Environmental sciences
9. Public health (community health)
10. New process/chemical evaluation (pre OEL)

Skill in:

1. Extracting critical information from literature, standards, guidelines and other resources
2. Prioritizing hazards for evaluation
3. Anticipating exposure scenarios
4. Recognizing known potential hazards
5. Inventorying hazards
6. Surveying tasks, operations, and sites
7. Communicating with affected parties
8. Exposure reconstruction & forensic investigation

Task 2. Assess the relationship between exposure and the potential adverse health effects to determine if further action is warranted using recognized scientific principles, literature, and standards.

Knowledge of:

1. Basic math and sciences
2. Statistics
2. Biological/chemical/physical/ergonomic hazards
3. Industry/work environments
4. Process (unit operations) knowledge
5. Toxicology
6. Epidemiology

7. Environmental sciences
8. Public health (community health)
9. Risk assessment
10. New process/chemical evaluation (pre-OEL)

Skill in:

1. Applying principles and concepts of toxicology (dose response, acute/chronic, latency, routes of entry)
2. Applying principles and concepts of epidemiology (study design, measures of disease, and statistics)
3. Assessing information source credibility
4. Communicating with affected parties

Task 3. Design and implement an exposure assessment strategy (qualitative and/or quantitative) to determine the extent and magnitude of exposure using relevant principles to ensure scientific validity.

Knowledge of:

1. Basic math and sciences
2. Statistics
3. Biological/chemical/physical/ergonomic hazards
4. Industrial knowledge/work environments
5. Process (unit operations)
6. Sampling methods and instrumentation
7. Analytical chemistry
8. Study design
9. Standards/guidelines
10. Medical surveillance/monitoring technologies

Skill in:

1. Designing exposure assessment strategies
2. Applying statistical principles to study design
3. Identifying appropriate exposed population(s)
4. Selection and use of appropriate sampling methods (instrumentation, analysis, strengths and limitations)
5. Reviewing pertinent information (historical sampling data, existing controls, materials inventory, process review, work practices)
6. Identifying routes of exposure
7. Implementing qualitative & quantitative exposure assessment strategies
8. Developing and managing projects
9. Conducting basic research
10. Operating instruments, including calibration
11. Keeping field records
12. Communicating with affected parties
13. Identifying appropriate analytical methods

Task 4. Formulate conclusions, prioritize risks, and communicate findings and recommendations based on analysis and evaluation of data using standards, guidelines and ethical professional judgment.

Knowledge of:

1. Basic math and sciences
2. Biological/chemical/physical/ergonomic hazards

3. Industry/work environments
4. Process (unit operations)
5. Toxicology
6. Analytical chemistry
7. Standards and guidelines
8. Epidemiology
9. Risk communication
10. Statistics
11. Hierarchy of controls
12. Environmental sciences
13. Public health (community health)

Skill in:

1. Analyzing sample data
2. Comparing sampling results to known standards/guidelines
3. Evaluating the quality of data (both new and old)
4. Evaluating potential risks of previously unrecognized hazards
5. Identifying potential risks of complex/complicated exposure scenarios
6. Developing & managing projects including risk management, evaluation of business impacts, sustainability and product stewardship
7. Characterizing risk (affected parties)
8. Communicating risk (oral, written)

Domain II: Control Selection, Implementation, and Validation
35%

Task 1. Assess and select options to eliminate or mitigate exposure using the hierarchy of controls and recognized scientific principles, literature, standards, and design and performance criteria.

Knowledge of:

1. Hierarchy of controls
2. Ventilation design (local exhaust, dilution and HVAC)
3. Basic math and sciences
4. Aerosol science
5. Industrial processes and unit operations
6. Controls of biological, chemical, physical and ergonomic hazards
7. Hazardous material and remediation response
8. Principles of radiation and other physical energy protection (time, distance, shielding)
9. Principles of noise and noise abatement
10. Principles of thermal stressor control
11. PPE (protection factors, protective clothing, permeability/degradation, NRR)
12. Toxicology and routes of entry
13. Physiology and anatomy
14. Physical properties and chemical incompatibility
15. Work routines/work environments
16. Education and training
17. Work practices
18. Community exposure
19. Business impacts, sustainability and product stewardship
20. Exposure guidelines
21. Impact of the environment and people on the controls selected

Skill in:

1. Designing hazard controls (ventilation, noise abatement, radiation/physical energy, systems, PPE)
2. Measuring air flow parameters
3. Applying hierarchy of controls
4. Defining the relevant physical properties of chemical and biological materials
5. Selecting proper PPE based on strengths and limitations
6. Evaluating the environment in which the control is to be used
7. Developing and managing projects including risk management, evaluation of business impacts, sustainability and product stewardship
8. Determining frequency, probability and severity of exposure
9. Considering individual differences in workers
10. Interpreting building specifications

Task 2. Develop and implement appropriate control programs and techniques designed to eliminate or mitigate exposure, using standards, guidelines, literature and ethical professional practice.

Knowledge of:

1. Design of hazard controls (ventilation, noise abatement, radiation/physical energy, systems, PPE)
2. Requirements for writing performance specifications
3. Coordinating financial and staff resources
4. Procedures for training personnel in the use and application of control method
5. Industrial processes and unit operations (routine and emergency)
6. Hierarchy of controls
7. Communication strategies and tools
8. PPE selection and limitations
9. Reporting structures, roles and responsibilities
10. Emergency response programs and principles

Skill in:

1. Designing control systems
2. Project management
3. Training strategies and tools
4. Applying exposure abatement technologies
5. Remediating biological, chemical, physical and ergonomic hazards
6. Responding to chemical hazard emergencies
7. Applying ergonomic interventions
8. Interpreting engineering instructions and specifications
9. Policy development

Task 3. Validate the effectiveness of controls to eliminate or mitigate exposure using recognized scientific principles, literature, standards, and design and performance criteria.

Knowledge of:

1. Basic math and sciences
2. Aerosol science
3. Statistics
4. Principles of radiation and other physical energy protection (time, distance, shielding)
5. Principles of noise and noise abatement
6. Principles of thermal stressor control
7. Air sampling (chemical and biological agents)

8. Measurement techniques (ventilation, radiation, noise, thermal stress, vibration)
9. Microbiology
10. Ergonomic risk factors
11. Industrial process and unit operations (routine and emergency)
12. Application of exposure guidelines
13. Application of acceptable ventilation criteria
14. Hierarchy of controls
15. Control specifications
16. Equipment/technology used to validate control effectiveness
17. Auditing and quality assurance procedures
18. Basic research techniques

Skill in:

1. Selection and use of appropriate sampling methods (instrumentation, analysis, strengths and limitations)
2. Ventilation measurements
3. Noise and vibration measurements
4. Radiation measurements
5. Thermal stress measurements
6. Comparing air sampling and measurement data to recognized criteria
7. Troubleshooting control technology
8. Reading and interpreting design drawings and specifications
9. Developing & managing projects including risk management, evaluation of business impacts, sustainability and product stewardship
10. Program auditing

Domain III: Risk Management
15%

<u>Task 1</u>. Develop and implement programs/systems that address health risks using recognized risk-based methods and scientific principles, literature, standards and effective communication strategies.

Knowledge of:

1. Industrial hygiene program management principles and best practices
2. Risk assessment principles
3. Standards and guidelines
4. Audit and quality assurance procedures
5. Communication strategies and tools
6. Emergency response programs and principles
7. Procedures for training personnel

Skill in:

1. Communicating and interpreting regulatory requirements and communicating with regulatory agencies
2. Communicating industrial hygiene program components, including report writing and presentation
3. Managing program resources
4. Integrating industrial hygiene program needs into business plans
5. Prioritizing program needs
6. Identifying appropriate target audiences
7. Identifying appropriate program performance measurements
8. Communicating risk to affected parties
9. Program auditing

10. Understanding rationale for and application of occupational and environmental exposure limits (BEIs, TLVs)
11. Training strategies and tools

Task 2. Evaluate and maintain the effectiveness of programs/systems designed to eliminate or mitigate exposure using regulations, standards, guidelines, and ethical professional practice.

Knowledge of:

1. Industrial hygiene program management principles and best practices
2. Risk assessment principles
3. Standards and guidelines
4. Communication strategies and tools
5. Procedures for training personnel
6. Audit techniques and quality assurance procedures
7. Data management systems and record keeping requirements
8. Program performance measurements and metrics

Skill in:

1. Communicating industrial hygiene program components, including report writing and giving presentations
2. Communicating standards and guidelines
3. Managing program resources
4. Prioritizing program needs
5. Training strategies and tools
6. Program auditing
7. Collecting and analyzing performance data
8. Performing program management analysis