CIH® Exam Blueprint

Based on the 2021 Job Analysis. (Effective April 1, 2022)

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 to perform the tasks are also included.

Domain I: Exposure Assessment Principles and Practice

This section comprises 50% of the exam.

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/work environments (e.g., raw materials/products, intermediates, final products, and waste streams)
4. Industrial processes and systems (e.g., welding, foundry operations)
5. Toxicology
6. Standards and guidelines
7. Epidemiology and statistics
8. Environmental health sciences
9. Public health (i.e., community health)
10. Health hazards with no existing OEL

Skill in:

1. Extracting critical information from literature, standards, guidelines, and other resources
2. Recognizing known potential hazards
3. Prioritizing hazards for evaluation
4. Anticipating exposure scenarios
5. Surveying tasks, materials/products, operations, and sites
6. Communicating with affected parties
7. Reconstructing exposures and conducting forensic investigations

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, standards, and guidelines.

Knowledge of:

1. Basic math and sciences
2. Biological/chemical/physical/ergonomic hazards
3. Industry/work environments (e.g., raw materials/products, intermediates, final products, and waste streams)
4. Industrial processes and systems (e.g., welding, foundry operations)
5. Toxicology
6. Epidemiology and statistics
7. Environmental health sciences
8. Public health (i.e., community health)
9. Risk assessment
10. Health hazards with no existing OEL

Skill in:

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

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

Knowledge of:

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

4. Industrial/work environments (e.g., raw materials/products, intermediates, final products, and waste streams)
5. Industrial processes and systems (e.g., welding, foundry operations)
6. Sampling methods and instrumentation
7. Analytical chemistry
8. Study design
9. Standards and guidelines
10. Medical surveillance
11. Exposure monitoring techniques (e.g., personal, area, biological)

Skill in:

1. Designing exposure assessment strategies
2. Applying statistical principles to study design
3. Identifying similar exposure group(s)
4. Selecting and using appropriate sampling methods (e.g., instrumentation, analysis, strengths, and limitations)
5. Reviewing pertinent information (e.g., historical sampling data, existing controls, material/product inventory, process review, work practices)
6. Considering route(s) of exposure
7. Implementing exposure assessment strategies
8. Operating instruments, including calibration
9. Keeping field records
10. Communicating with affected parties
11. Identifying appropriate analytical methods

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

Knowledge of:

1. Basic math and sciences
2. Biological/chemical/physical/ergonomic hazards
3. Industry/work environments (e.g., raw materials/products, intermediates, final products, and waste streams)
4. Industrial processes and systems (e.g., welding, foundry operations)
5. Toxicology
6. Analytical chemistry
7. Standards and guidelines
8. Epidemiology and statistics
9. Risk communication
10. Hierarchy of controls
11. Environmental health sciences
12. Public health (i.e., community health)

Skill in:

1. Analyzing sample data
2. Comparing sampling results to known standards/guidelines
3. Evaluating the quality of data
4. Evaluating potential risks of previously unrecognized hazards
5. Identifying potential risks of complex/complicated exposure scenarios
6. Evaluating business impacts
7. Characterizing risk for affected parties
8. Communicating risk

Domain II: Control Selection, Recommendation/Implementation, and Validation

This section comprises 35% of the exam.

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

Knowledge of:

1. Hierarchy of controls
2. Ventilation design (e.g., local exhaust, dilution, and HVAC)
3. Basic math and sciences
4. Aerosol science
5. Industrial processes and systems (e.g., welding, foundry 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 (e.g., time, distance, shielding)
9. Principles of noise and noise abatement
10. Principles of thermal stressor control
11. PPE (e.g., protection factors, protective clothing, permeability/degradation, NRR)
12. Toxicology and routes of exposure
13. Physiology and anatomy
14. Physical properties and chemical incompatibility
15. Work routines and environments
16. Education and training
17. Work practices
18. Community exposure
19. Business impacts
20. Exposure guidelines
21. Impact of the environment and people on the controls selected

Skill in:

1. Assessing effectiveness of existing controls (e.g., ventilation, noise abatement, radiation shielding, PPE)
2. Designing hazard controls (e.g., ventilation, noise abatement, radiation shielding, PPE)
3. Measuring air flow parameters (e.g., static pressure, face velocity)
4. Applying hierarchy of controls
5. Defining the relevant physical properties of chemical and biological materials
6. Selecting proper PPE based on strengths and limitations
7. Evaluating the environment in which the control is to be used
8. Evaluating business impacts
9. Determining frequency, probability, and severity of exposure
10. Considering individual differences in workers (e.g., anthropometric information for ergonomic hazards, PPE effectiveness)
11. Interpreting building specifications

Task 2. Develop and recommend/implement appropriate controls designed to eliminate or mitigate exposure using literature, standards, guidelines, and ethical professional judgement.

Knowledge of:

1. Hazard controls (e.g., ventilation, noise abatement, radiation shielding, PPE)
2. Requirements for writing performance specifications
3. Resource management (e.g., financial, staff)
4. Training requirements and methods
5. Industrial processes and systems (e.g., 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. Training strategies and tools
3. Coordinating resources
4. Applying exposure elimination and mitigation techniques
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. Developing policies

Task 3. Validate the effectiveness of controls to eliminate or mitigate exposure using recognized scientific principles, literature, standards, guidelines, 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 (e.g., time, distance, shielding)
5. Principles of noise and noise abatement
6. Principles of thermal stressor control
7. Air sampling (e.g., chemical and biological agents)
8. Measurement techniques (e.g., ventilation, radiation, noise, thermal stress, vibration)
9. Microbiology
10. Ergonomic risk factors
11. Industrial processes and systems (e.g., routine and emergency)
12. Application of exposure guidelines
13. Application of acceptable ventilation criteria
14. Hierarchy of controls
15. Control specifications
16. Equipment and 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 (e.g., instrumentation, analysis, strengths, and limitations)
2. Performing ventilation surveys (e.g., measurement, calculation, analysis)
3. Performing noise and vibration surveys (e.g., measurement, calculation, analysis)
4. Performing radiation surveys (e.g., measurement, calculation, analysis)
5. Performing thermal stress surveys (e.g., measurement, calculation, analysis)
6. Comparing air sampling and measurement data to recognized criteria
7. Troubleshooting control technology
8. Reading and interpreting design drawings and specifications
9. Evaluating business impacts
10. Auditing programs/systems

Domain III: Risk Management

This section comprises 15% of the exam.

Task 1. Develop and recommend/implement programs/systems that address health risks using recognized risk-based methods, ethical professional judgment, and effective communication strategies.

Knowledge of:

1. Industrial hygiene program/system 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
8. BGC Code of Ethics

Skill in:

1. Developing programs/systems
2. Communicating and interpreting regulatory requirements and communicating with regulatory agencies
3. Communicating industrial hygiene program/system components (e.g., report writing, presentation)
4. Interpreting standards and guidelines
5. Managing program/system resources
6. Integrating industrial hygiene program/system needs into business plans
7. Prioritizing program/system needs
8. Identifying appropriate target audiences
9. Identifying appropriate program/system performance measurements
10. Communicating risk to affected parties
11. Auditing of programs/systems
12. Understanding rationale for and application of occupational and environmental exposure limits (e.g., BEIs, TLVs)
13. Training strategies and tools
14. Applying ethical decision-making

Task 2. Evaluate and maintain the effectiveness of programs/systems designed to eliminate or mitigate risk using recognized scientific principles, literature, standards, and guidelines.

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. Resource management (e.g., financial, staff)
7. Audit techniques and quality assurance procedures
8. Data management systems and record keeping requirements
9. Program/system performance measurements and metrics

Skill in:

1. Communicating industrial hygiene program/system components (e.g., report writing, delivering presentations)
2. Communicating standards and guidelines
3. Managing program/system resources
4. Prioritizing program/system needs
5. Training strategies and tools
6. Auditing programs/systems
7. Collecting and analyzing performance data
8. Performing program/system management analysis