

Job Analysis - Certified Industrial Hygienist (CIH) Examination
November, 2008 Update (Effective October 1, 2009)

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 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 agents, products, and processes.

Knowledge of:

1. Basic sciences
2. Biological/chemical/physical/ergonomic hazards
3. Industry knowledge including raw materials, intermediates & final products
4. Process (unit operations) knowledge
5. Toxicology
6. Standards/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 sciences

2. Biological/chemical/physical/ergonomic hazards
3. Industry knowledge/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. Understanding principles and concepts of toxicology (dose response, acute/chronic, latency, routes of entry)
2. Understanding principles and concepts of epidemiology (study design, cohorts)
3. Assessing 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 sciences
2. Biological/chemical/physical/ergonomic hazards
3. Industrial knowledge/work environments
4. Process (unit operations) knowledge
5. Sampling methods and instrumentation
6. Analytical chemistry
7. Study design
8. Standards/Guidelines
9. Statistics
10. Medical surveillance/monitoring technologies

Skill in:

1. Design exposure assessment strategies
2. Applying statistical principles to study design
3. Identifying appropriate exposed population(s)
4. Selecting appropriate sampling methods (instrumentation, analysis, strengths and limitations)
5. Understanding of industries and processes
6. Reviewing pertinent information (historical sampling data, existing controls, materials inventory, process review, work practices)
7. Understanding physical/chemical properties

8. Identifying routes of exposure
9. Implementing qualitative & quantitative exposure assessment strategies
10. Conducting investigations
11. Developing and managing projects
12. Conducting basic research
13. Knowing how to operate instruments, including calibration
14. Keeping good field records (chain of custody, sample labeling, field blanks)
15. Interacting with affected parties (interpersonal skills, human relations)
16. Identifying appropriate analytical methods

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

Knowledge of:

1. Basic sciences
2. Biological/chemical/physical/ergonomic hazards
3. Industry knowledge/work environments
4. Process knowledge
5. Toxicology
6. Analytical chemistry
7. Standards/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. Ventilation design (local exhaust, dilution, and HVAC)
2. Basic sciences, including physics, chemistry, biology, and aerosol sciences
3. Industrial processes and unit operations
4. Biomechanics, ergonomics, time and motion studies, and ergonomic intervention techniques
5. Principles of biohazard control
6. Hazardous material and remediation response
7. Principles of radiation and other physical energy protection (time, distance, shielding)
8. Principles of noise and noise abatement
9. PPE (protection factors, protective clothing, permeability/degradation, NRR)
10. Comprehensive understanding of toxicology
11. Physiology and anatomy, and routes of exposure (airborne, dermal, ingestion)
12. Physical properties and chemical incompatibility
13. Exposure guidelines
14. Work routines/work environments
15. Education and training
16. Work practices
17. Thermal stressor control
18. Hierarchy of controls
19. Community stressors
20. Cost impact for different control methods
21. Exposure guidelines
22. Impact of the environment and people on the controls selected

Skill in:

1. Designing controls
2. Conducting IH sampling, measurements and analyzing data
3. Measuring air flow parameters
4. Designing ventilation systems
5. Choosing the correct control method
6. Evaluating impact of unit operation
7. Understanding relevant physical properties of chemical and biological materials
8. Understanding the limitations of protective equipment to select the proper PPE
9. Understanding the strengths and limitations of PPE
10. Understanding the environment in which the control is to be used
11. Applying cost comparison
12. Understanding frequency, probability and severity of exposure
13. Understanding of protective factors (NRR, PF)
14. Understanding individual differences in workers
15. Interpreting building specifications

Task 2. Develop and implement appropriate control programs and techniques designed to eliminate or mitigate exposure.

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
6. Hierarchy of controls
7. Training design & implementation, including adult learning
8. Communication strategies & tools
9. PPE selection & limitations
10. Reporting structures, roles & responsibilities

Skill in:

1. Designing control systems
2. Understanding unit operations
3. Applying project management skills
4. Performing training and education
5. Applying noise abatement technologies
6. Remediating biohazards and radiation
7. Remediating chemical hazards
8. Responding to chemical hazard emergencies
9. Applying proper ergonomic interventions
10. Reading and interpreting engineering instructions and specifications
11. Policy development
12. Developing & managing projects

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. Air sampling (chemical and biological agents)
2. Measurement techniques (ventilation, radiation, noise, thermal stress, vibration)
3. Basic science and statistics
4. Aerosol science
5. Principles of radiation
6. Microbiology
7. Ergonomic risk factors
8. Industrial process and unit operations

9. Application of exposure guidelines
10. Application of acceptable ventilation criteria
11. Hierarchy of controls
12. Control specifications
13. Equipment/technology used to validate control effectiveness
14. Auditing & quality assurance procedures
15. Basic research techniques

Skill in:

1. Using air sampling equipment
2. Making ventilation measurements
3. Making noise and vibration measurements
4. Making radiation measurements
5. Making 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

Domain III: Risk Management
15%

Task 1. Develop and implement programs that address health risks using recognized risk-based methodologies and appropriate scientific principles, literature, standards and effective communication strategies.

Knowledge of:

1. Comprehensive industrial hygiene program management principles, risk assessment principles, best practices, and regulatory requirements
2. Audit techniques
3. Communication strategies (concerning regulatory requirements, program needs)
4. Emergency planning and response procedures & resources

Skill in:

1. Communicating and interpreting regulatory requirements and communicating with regulatory agencies
2. Communicating industrial hygiene program components, including report writing & 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. Risk communication
9. Program auditing
10. Understanding rationale for and application of occupational exposure limits (BEIs, TLVs)
11. Communicating environmental health stressors

Task 2. Evaluate programs designed to eliminate or mitigate exposure to assure effectiveness by comparing them to regulations, standards, guidelines, and professional practice.

Knowledge of:

1. Comprehensive industrial hygiene program management principles, best practices, and regulatory requirements
2. Communication strategies (concerning regulatory requirements, program needs)
3. Industrial hygiene program training needs
4. Audit techniques
5. Data management systems and record keeping requirements
6. Performance measurements/metrics

Skill in:

1. Communicating industrial hygiene program components, including report writing & presentation
2. Communicating regulatory requirements
3. Managing program resources
4. Prioritizing program needs
5. Training skills
6. Program auditing
7. Collecting performance data
8. Analyzing performance data
9. Performing program management analysis (gap analysis, benchmarking, etc.)