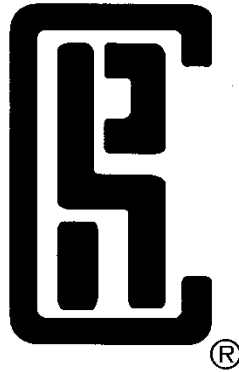


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***BLUEPRINT FOR THE
CANADIAN REGISTERED
SAFETY TECHNICIAN
EXAMINATION (CRSTEX)***

2024

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PREFACE

The Board of Canadian Registered Safety Professionals (BCRSP) is pleased to present the *Blueprint for the Canadian Registered Safety Technician Examination* (CRSTEX). Administration of the first examination developed from the Blueprint is targeted for March 2024.

The Blueprint was developed to guide those involved in the development of the *Canadian Registered Safety Technician Examination* and to provide the public (e.g., examinees, educators, administrators) with practical information about the examination.

The Blueprint has two major components: (1) the content domain to be measured and, (2) the explicit guidelines on how this content is to be measured. The content domain consists of the CRSTEX set of competencies (i.e., the competencies expected of entry-level registered safety technicians), and the guidelines are expressed as structural and contextual variables. The Blueprint also includes: a *Summary Chart* (p.10) that summarizes the examination guidelines; a *Glossary* (p. 11) that provides definitions of terms appearing in bold throughout the document.

BCRSP wishes to thank all the individuals who have contributed to the creation of this Blueprint. In particular, thanks are extended to registered safety technicians and registered safety professionals who participated in the development of the competency framework and to those who responded to the competency validation survey.

The Blueprint will be evaluated regularly to reaffirm that the competencies and the guidelines for examination development continue to reflect what is expected of an entry-level registered safety technician beginning to practice, and is differentiated from that of entry-level registered safety professionals.

BCRSP encourages all users of this document to provide feedback which may be useful in future revisions of the Blueprint. Please forward all such comments to:

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INTRODUCTION

The Board Canadian Registered Safety Professionals develops the Canadian Registered Safety Technician Examination (subsequently referred to as the CRSTEX) for registering purposes. It fulfills this service by working in collaboration with Canadian Registered Safety Technicians (CRST's) and Canadian Registered Safety Professionals (CRSP's) from across Canada who serve as the content experts for developing and validating the examinations.

Registration/licensure/certification examinations have a well-defined purpose: to protect the public by ensuring that those who are licensed possess sufficient knowledge and skills to perform important occupational activities safely and effectively (Canadian Psychological Association, 1987). In the case of the CRSTEX, the purpose is to determine whether or not examinees are prepared to practice occupational health and safety, without risk to the public and to the environment.

The purpose of this Blueprint is to describe how the examination is to be developed.

The primary function of the Blueprint for the Canadian Registered Safety Technician Examination is to describe how the examination is to be developed. Specifically, this Blueprint provides explicit instructions and guidelines on how the **competencies**¹ (e.g., knowledge, abilities, skills, attitudes, and judgment) are to be expressed within the examination in order for accurate decisions to be made on the ability of examinees to practice safely and effectively.

Prior to producing this Blueprint, BCRSP undertook an extensive study to identify the competencies required for the safe and effective practice of registered safety technicians in Canada. Individual registered safety technicians and professionals from across the country were active participants in all phases of the investigation, which served to identify and validate a comprehensive set of 64 competencies expected of the registered safety technician. With this set of competencies, and the validation data obtained, the essential components of the CRSTEX could be clearly described.

The periodic and comprehensive review of the competencies measured by the CRSTEX assists the BCRSP in maintaining the validity of the CRSTEX, and to develop psychometrically sound and legally defensible registration examinations. Because of changes that occur in the practice

of health and safety technicians and professionals alike, a validation study of the competencies is conducted at least every five years, or as needed. In addition to the periodic comprehensive review and validation study, the competencies are reviewed and evaluated on a regular basis by content experts. This helps to ensure that the CRSTEX remains differentiated from the registration examination used for safety professionals in Canada, the CRSPEX.

Furthermore, during the most recent comprehensive review of the CRSTEX competencies, a group of content experts has developed a list of assumptions to better delineate the role and expectations of a CRST.

CRST ASSUMPTIONS

- Implementer/executor of OHS management systems.
- Developer and implementer of the tactics to support existing strategies.
- Communicates with relevant parties, building relationships as a basis for influence, mentoring and providing technical advice.
- Supports safe working environment by maintaining administrative processes, conducting training, and using state-of-the-art tools, processes, and standard practice solutions.
- Focuses on organization's primary processes operating in known contexts within established parameters.
- Accesses, evaluates, and uses a broad range of workplace and industry sources of information.
- Advice/action based on technical knowledge, experience, and input by other OHS professionals and subject matter experts.
- Strives to continually improve one's organization and self.
- Understands and operates within the boundaries of the CRST scope of practice.

¹ The terms appearing in bold are defined in the Glossary.

TECHNICAL SPECIFICATIONS

The following section presents the technical specifications that are to guide the development of the CRSTEX. In the first part, issues related to the competencies are addressed. The second part describes the guidelines to be followed in addressing the structural and contextual variables of the CRSTEX.

The CRSTEX is a criterion-referenced examination. That is, a fundamental component of the development of the CRSTEX is a comprehensive description of the content domain being measured. In the case of the CRSTEX, the content domain of interest consists of the competencies a registered safety technician is required to possess in order to practice safely and effectively at the technician level. These competencies form the basis of the CRSTEX.

This section describes the competencies that were obtained as a result of the validation process, the way they have been grouped, and the manner in which they are to be sampled in the examination development process.

DEVELOPING THE SET OF COMPETENCIES

The competencies were evaluated by 100 Canadian Registered Safety Technicians representing approximately 30-35% of all current CRSTs.

As a starting point for developing a new set of competencies, a Committee on Technician Competencies was formed that was representative of all areas of practice of registered safety technicians in Canada. This committee reviewed the current set of CRST competencies, along with other recent competency lists prepared for health and safety. Using these competency lists, the committee developed a preliminary national set of competencies, and a five-category classification to group these competencies. The competencies in this initial set were then evaluated by a sample of 100 Canadian Registered Safety Technicians (CRST's) representing approximately 30-35% of all current CRSTs. The sample included practitioners, educators, and administrators, who were asked to rate each competency in terms of its applicability, importance, and frequency for the registered safety technician. The Committee on Technician Competencies reviewed the results of the survey. The CRSTEX set of competencies has the primary purpose of providing the content domain for the examination.

COMPETENCY CATEGORIES

The classification of the competencies consisted of the following five categories defined below (the number and the percentage of competencies are indicated in parentheses following the category name):

1. Hazard Identification, Risk Assessment and Controls (18 competencies or 28% of the set of competencies)
2. Health and Safety Systems (11 competencies or 17% of the set of competencies)
3. Legal, Ethical, and Professional Practice (10 competencies or 16% of the set of competencies)
4. Technical Safety Fundamentals (15 competencies or 23% of the set of competencies)
5. Social and Human Sciences (10 competencies or 16% of the set of competencies)

Some of the competencies lend themselves to being placed in one or more of the categories, so these five categories should be viewed simply as an organizing framework. It should be recognized that the competency statements vary in scope, with some representing global activities and others more discrete and specific actions.

There will be 190 to 210 operational multiple choice questions on the Canadian Registered Safety Technician Examination.

The Canadian Registered Safety Technician Examination represents the different areas of practice of registered safety technicians.

STRUCTURAL VARIABLES

In addition to the specifications related to the competencies, other variables must be considered during the development of the CRSTEX. Structural variables include those characteristics that determine the general appearance and design of the examination. They define the length of the examination and the format/presentation of the examination questions (e.g., multiple-choice format). The weightings of the five categories are also included as structural variables.

- **Examination Length and Format**: The examination will consist of between 190 and 210 operational multiple choice questions. With 64 competencies to measure and a sound sampling approach for these competencies, an examination of between 190 and 210 operational questions is sufficient to make both reliable and valid decisions about an examinee's readiness to practice safely and effectively.
- **Question Presentation**: The multiple choice questions of the CRSTEX are presented in one of two formats, **case-based** or **independent** questions.
- **Item Taxonomy**: Each question on the CRSTEX is classified into one of three categories adapted from Bloom's Taxonomy of Cognitive Abilities. More specifically, each question is categorized into either **knowledge/comprehension**, **application** or **critical thinking**.

CONTEXTUAL VARIABLES

In addition to structural variables, contextual variables qualify the content domain by specifying the contexts in which the examination questions will be set (i.e., technician context).

It is recognized that the practice environment of entry-level registered safety technicians can be any setting or circumstance within which occupational health and safety can be practiced, and is distinct from that of registered safety professionals. The competencies assessed by

the examination are not setting dependent. The practice environment will be specified when necessary.

In each setting, the safety technician may serve as a practitioner, technologist, or advisor. This will be considered in forming the context of examination items.

COMPETENCY WEIGHTINGS

To ensure that the examination accurately reflects the profile of the registered safety technician, the competencies were weighted according to their relative importance and frequency based on the survey ratings and a quantitative review by content experts.

The CRSTEX Set of Competencies presents the competencies grouped on the basis of the ratings from the validation survey.

These weightings were used to establish the relative emphasis that the competencies will receive on the examination. The competencies have been weighted using the application, importance and frequency ratings obtained in the competency validation study.

Based on the applicability, importance and frequency data extracted from the 2023 Competency Validation Survey, and with the guideline that the CRSTEX will consist of between 190 and 210 questions, the sampling scheme presented in the table below was developed. The distribution of weights in this sampling scheme was selected: (1) to provide differentiation on the rating variables (importance and frequency); (2) to conform with the examination length requirement. The following table presents the percentage range of questions in each of the five categories of competencies.

Competency Categories	Percentage of Questions on the CRSTEX
1. Hazard Identification, Risk Assessment and Controls	26 - 32%
2. Health and Safety Systems	14 - 20%
3. Legal, Ethical, and Professional Practice	14 - 20%
4. Technical Safety Fundamentals	22 - 28%
5. Social and Human Sciences	9 - 15%

CONCLUSION

The *Blueprint for the Canadian Registered Safety Technician Examination* is the product of a collaborative effort between BCRSP, Canadian Registered Safety Technicians (CRST's), and Canadian Registered Safety Professionals (CRSP's). Their efforts have resulted in a compilation of the competencies required of the entry level registered safety technician to practice and of the guidelines on how the competencies will be measured on the CRSTEX. A summary of these guidelines can be found in the CRSTEX Examination Development Summary Chart, on page 10.

It is recognized that the health and safety profession will continue to evolve. As this occurs, the Blueprint (i.e., the competencies and the test development guidelines) may require revision so that it accurately reflects the scope of practice, roles, and responsibilities of the entry level safety technician, and that these remain differentiated from the registered safety professional. BCRSP will ensure this revision takes place in a timely manner and will communicate it in updated editions of this document.

CRSTEX EXAMINATION DEVELOPMENT SUMMARY CHART

Examination Length and Format	190 to 210 operational multiple-choice questions. Three and a half (3.5) hours will be allocated for the completion of the examination.	
Question Presentation	Independent questions	80 - 90%
	Case-based questions	10 - 20%
Competency Categories and Weightings	1. Hazard Identification, Risk Assessment and Controls	26 - 32%
	2. Health and Safety Systems	14 - 20%
	3. Legal, Ethical, and Professional Practice	14 - 20%
	4. Technical Safety Fundamentals.	22 - 28%
	5. Social and Human Sciences	9 - 15%
Item Taxonomy	Knowledge/Comprehension	70 - 80%
	Application	20 - 30%
	Critical Thinking	Maximum of 5%

GLOSSARY

application: The cognitive ability to apply knowledge and learning to new or practical situations.

case-based questions: A set of questions associated with a brief scenario.

competencies: The behaviour statements which reflect the combined knowledge, abilities, skills, attitudes, and judgment expected of an entry level registered safety technician.

criterion-referenced (C-R) examination: A test that measures the degree of command of a specified content/skills domain or list of instructional objectives. Scores are interpreted in comparison to a predetermined performance standard, or as a degree of mastery of a defined domain (e.g., percent correct and mastery scores), independently of the results obtained by other candidates. (Brown, 1983)

critical thinking: The cognitive ability level to judge the relevance of data, to deal with abstractions and to solve problems.

independent items: Stand-alone objective examination items which contain the information necessary for responding.

knowledge/comprehension: The cognitive ability to recall previously learned material and to understand its meaning.

operational questions: Questions appearing on the examination that have been pre-tested and that are suitable for the examination. The answer to these questions count in the candidate's score.

CRSTEX COMPETENCY PROFILE

Hazard Identification, Risk Assessment and Controls (HIRAC)	
HIRAC1	Demonstrate an understanding of the hazards and controls of safe material handling and storage.
HIRAC2	Demonstrate an understanding of the hazards and controls of hoisting and conveying equipment (e.g., ropes, chains, slings, cranes, etc.).
HIRAC3	Demonstrate an understanding of the hazards and controls of powered mobile equipment, heavy machinery, and vehicles (e.g., forklifts, scissor lifts, bucket trucks, pickup trucks, excavators, etc.).
HIRAC4	Demonstrate an understanding of the hazards and controls associated with elevated work (e.g., ladders, fall protection, platforms, scaffolds, etc.).
HIRAC5	Demonstrate an understanding of the hazards and controls of hand and portable power tools.
HIRAC6	Demonstrate an understanding of the hazards and controls of machinery.
HIRAC7	Demonstrate an understanding of the hazards and controls associated with hot work (e.g., welding, cutting, brazing, etc.).
HIRAC8	Demonstrate an understanding of the hazards and the controls of hazardous energy (e.g., lockout/tagout of hydraulic, pneumatic, steam, mechanical, electrical hazards, etc.).
HIRAC9	Demonstrate an understanding of the hazards and controls associated with automated systems, equipment, and processes (e.g., robotics, remote starts, computer-controlled systems, nanotechnology, etc.).
HIRAC10	Demonstrate an understanding of the hazards and controls associated with confined space entry.
HIRAC11	Demonstrate an understanding of the hazards and controls associated with working alone or remotely.
HIRAC12	Demonstrate an understanding of the hazards and controls associated with non-traditional work settings (e.g., home, vehicle, hybrid, etc.).
HIRAC13	Demonstrate an understanding the hazards and controls of ground disturbance (e.g., excavation, trenching, blasting, shoring, fencing, locates, etc.)
HIRAC14	Demonstrate an understanding of the characteristics, hazards and controls associated with gases, vapours, solvents, fumes, mists, nanomaterials, and dusts.
HIRAC15	Demonstrate an understanding of physical hazards and their controls (e.g., noise, ionizing and non-ionizing radiation, laser, thermal stress, vibration, etc.).
HIRAC16	Demonstrate an understanding of biological hazards and their controls (e.g., mold, mycotoxins, influenza, viruses, wildlife, bugs and vegetation, etc.).
HIRAC17	Demonstrate an understanding of risk assessment principles and techniques (e.g., inventory, risk matrix, prioritization, etc.).
HIRAC18	Demonstrate an understanding of risk control processes (e.g., weight of evidence, ALARA, etc.).

Health and Safety Systems (HSS)	
HSS1	Demonstrate an understanding of workplace inspections.
HSS2	Demonstrate an understanding of workplace incident investigations.
HSS3	Demonstrate an understanding of job hazard analyses/job safety analyses.
HSS4	Demonstrate an understanding of auditing principles and techniques.
HSS5	Demonstrate an understanding of management system standards and audits.
HSS6	Demonstrate an understanding of risk management programs.
HSS7	Demonstrate an understanding of emergency preparedness and response programs.
HSS8	Demonstrate an understanding of fire safety programs.
HSS9	Demonstrate an understanding of the roles and functions of standard-setting bodies (e.g., National Fire Prevention Association, Underwriters Laboratory, Factory Mutual, Canadian Standards Association, European Union, etc.).
HSS10	Demonstrate an understanding of occupational hygiene prevention and protection programs.
HSS11	Demonstrate an understanding of the components of an ergonomics program (e.g., CSA Z412, etc.).
Legal, Ethical, and Professional Practice (LEPP)	
LEPP1	Demonstrate an understanding of applicable legislation (e.g., Criminal Code, Hazardous Products Act, Transportation of Dangerous Goods Act, etc.)
LEPP2	Demonstrate an understanding of the duties of workplace parties (e.g., supervisors, workers, joint health and safety committees/representatives, Internal Responsibility System, etc.).
LEPP3	Demonstrate an understanding of codes and standards as applied to fire safety (e.g., National Building Code, National Fire Code, etc.).
LEPP4	Demonstrate an understanding of the rights and responsibilities of workplace parties.
LEPP5	Demonstrate an understanding of due diligence and the test of reasonableness
LEPP6	Demonstrate an understanding of the duties and powers of enforcement agencies (e.g., orders to comply, prosecutions, ticketing, administrative penalties, the appeal process, etc.).
LEPP7	Demonstrate an understanding of the role of the certified safety technician with respect to the BCRSP Code of Ethics and Professional Conduct
LEPP8	Demonstrate an understanding of the role of a specialist (e.g., ergonomist, occupational hygienist, auditor, occupational therapist, occupational health nurse, etc.).
LEPP9	Demonstrate an understanding of professional errors and omissions (e.g., legal, ethical consequences and indemnification, etc.)
LEPP10	Demonstrate an understanding of the limits of the professional practice (e.g., interaction with government agencies, scope of practice, boundaries of competence, etc.).
Technical Safety Fundamentals (TSF)	
TSF1	Demonstrate an understanding of the hierarchy of controls.
TSF2	Demonstrate an understanding of the importance of safety in the design, procurement, maintenance, and repair of tools, equipment, and materials.

TSF3	Demonstrate an understanding of safe use, handling, storage, and disposal associated with chemicals, explosives, and radioactive material in the workplace.
TSF4	Demonstrate an understanding of selection and use of personal protective equipment.
TSF5	Demonstrate an understanding of electrical safety (e.g., bonding, grounding, circuit interrupter, etc.).
TSF6	Demonstrate an understanding of laboratory safety.
TSF7	Demonstrate an understanding of fire chemistry and behaviour.
TSF8	Demonstrate an understanding of fire prevention practices.
TSF9	Demonstrate an understanding of the delivery of training programs.
TSF10	Demonstrate an understanding of routes of entry of hazardous substances.
TSF11	Demonstrate an understanding of ventilation (e.g., local, general, supply, exhaust, etc.).
TSF12	Demonstrate an understanding of occupational exposure limits (e.g., Threshold Limit Values (TLVs), Biological Exposure Indices (BEIs), action levels, etc.).
TSF13	Demonstrate an understanding of hazard communication (e.g., symbols, safety data sheets, labeling, database research resources, hazard awareness training, etc.).
TSF14	Demonstrate an understanding of statistics and analyses (e.g., mean, percentage, standard deviation, time weighted average, etc.).
TSF15	Demonstrate an understanding of emerging technology (e.g., artificial intelligence, drones, etc.) as tools to support safe work.

Social and Human Sciences (SHS)

SHS1	Demonstrate an understanding of ergonomics (e.g., anatomical, physiological, biomechanical, etc.).
SHS2	Demonstrate an understanding of the signs and symptoms of musculoskeletal injuries.
SHS3	Demonstrate an understanding of employee and family assistance programs.
SHS4	Demonstrate an understanding of workplace wellness.
SHS5	Demonstrate an understanding of disability management programs (e.g., modified work, rehabilitation, return to work, etc.).
SHS6	Demonstrate an understanding of the effects of fatigue on worker health and performance (e.g., shift work, fit for work, overtime, etc.).
SHS7	Demonstrate an understanding of adult learning principles.
SHS8	Demonstrate an understanding of occupational illness and disease (e.g., asthma, chemical and environmental sensitivity, dermatitis, cancer, etc.).
SHS9	Demonstrate an understanding of workplace violence and harassment prevention programs.
SHS10	Demonstrate an understanding of the characteristics of a psychologically safe workplace (e.g., CSA Z1003-13).