APPRENTICESHIP & CERTIFICATION

Study Guide
Sprinkler System Installer

Department of Advanced Education, Skills and Labour
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Introduction

This Study Guide has been developed by the Newfoundland and Labrador Department of Advanced Education, Skills and Labour, Apprenticeship and Trades Certification Division, to assist apprentices and trade qualifiers as they prepare to write the Interprovincial (IP) Red Seal Exam. IP Exams are available for all Red Seal trades. For a list of Interprovincial trades please refer to the Department of Advanced Education, Skills and Labour website: www.ed.gov.nl.ca/app/trades.html

Some of the specific goals of this guide are:

⇒ to help you understand the skills and knowledge that might be covered on the exam
⇒ to help you identify your strengths and weaknesses
⇒ to provide organization and structure for a course of study
⇒ to provide a list of resources to help you with your study plan
⇒ to support and supplement the teaching and learning process

This study guide outlines the theoretical portion of the program. The intent is not to replace technical training provided under the guidance of instructors. Rather, it is a tool to be used in conjunction with formal training.
Exam Process

Before the Exam
You must contact the nearest Apprenticeship and Trades Certification Divisional office to make request to write the IP Red Seal exam (See Appendix A for a list of regional offices). Upon approval, the Program Development Officer (PDO) will notify you of your eligibility to write the exam, and provide you with scheduling information. If you require special accommodations due to a disability or language barrier, please contact your regional office for information on applying for this service.

During the Exam
You must bring:
- personal identification such as a photo or signature ID or valid Newfoundland and Labrador driver’s license
- your notification letter

The following will be provided:
- a calculator (see Appendix B for calculator information)
- all other items required such as pencils, scrap paper, etc.

Important Note:
Personal cell phones, calculators, or other electronic equipment are NOT allowed into the exam room. If you do bring them, they will be stored away and returned to you when you have completed the exam.

After the Exam
Results will be mailed to you approximately seven to ten days after completion of the exam. All necessary instructions and information will be provided in the results letter.

The percentage mark you obtained will be provided. You will also be given a section by section breakdown, showing how many questions were in each section, as well as the number of questions in each section you completed successfully.

If you are successful in obtaining a 70% or more on your exam, you will be issued a Newfoundland and Labrador Certificate of Qualification with a Red Seal endorsement.
Exam Format

All IP Red Seal exams are written in multiple-choice format. Each exam has between 100 and 150 questions. A multiple choice question consists of a stem (a complete question) followed by four options (A, B, C, D). The stem contains all the information necessary to answer the question. The options consist of the one correct answer and three “distracters.” Distracters are incorrect. (See Appendix C for a sample answer sheet).

IP Red Seal exams contain three types of questions:

**Level 1  Knowledge and Recall**  
Questions at this level test your ability to recall and understand definitions, facts, and principles.

**Level 2  Procedural and Application**  
Questions at this level test your ability to apply your knowledge of procedures to a new situation.

**Level 3  Critical Thinking**  
Questions at this level test your ability to interpret data, solve problems and arrive at valid conclusions.

Level 1 Examples:

1. Why is a dielectric fitting used to connect copper piping to black steel piping?
   
   A. To prevent friction loss.  
   B. To allow expansion between joints.  
   C. To provide a tight joint.  
   D. To prevent electrolysis.
2. What will cause a single interlocked pre-action system to trip during a fire?
   
   A. Loss of air in sprinkler piping branch lines.
   B. Activation of sprinkler on branch line.
   C. Activation of low pressure alarm.
   D. Activation of fire detection system.

3. On which type of sprinkler system is a detector wire installed as a system activation device?
   
   A. Dry.
   B. Wet.
   C. Antifreeze.
   D. Pre-action.

Level 2 Examples:

1. When installing a 1000 gpm fire pump, how many 2 ½ in. hose valves would be installed on the test header?
   
   A. 2.
   B. 3.
   C. 4.
   D. 6.
2. When installing restraint devices, what size of rod is installed on an 8 in. underground pipe?
   A. 7/8 in.
   B. 3/4 in.
   C. 5/8 in.
   D. 1/2 in.

3. How are cast fittings attached to threaded steel pipe?
   A. Apply thread compound to female thread and tighten with spanner wrench.
   B. Apply thread compound to male thread and tighten with pipe wrench.
   C. Apply Teflon tape to female thread and tighten with pipe wrench.
   D. Apply Teflon tape to male thread and tighten with spanner wrench.

Level 3 Examples:

1. When determining friction loss in a bulk main, how many feet of schedule #40 pipe is equivalent to using two standard 6 in., 40° elbows?
   A. 10.
   B. 14.
   C. 18.
   D. 22.
2. What is the size of the bolts used with standard 8 in. x 13 ½ in. flanges?
   A. 9/16 in. x 3 in.
   B. 5/8 in. x 3 1/2 in.
   C. 3/4 in. x 3 1/2 in.
   D. 7/8 in. x 4 in.

3. When installing the main for a dry pipe system, what is the required minimum grade?
   A. 1/4 in. per 10 ft.
   B. 1/2 in. per 10 ft.
   C. 1/4 in. per 12 ft.
   D. 1/2 in. per 12 ft.

Source of Questions:
www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=221
Exam Content

Understanding the *National Occupational Analysis* (NOA)

The NOA is a document used for Red Seal trades that describes the knowledge, skills and abilities required by a fully competent tradesperson working in that trade. The content for the IP Red Seal exam is based on the NOA. The NOA is an excellent tool to use as you study for the Red Seal exam. NOAs can be found at [www.red-seal.ca](http://www.red-seal.ca).

NOA material is organized into major content areas called **BLOCKS**. The blocks are further broken down into **TASKS** and **SUB-TASKS**.
NOA Pie Chart

The NOA Pie Chart presents the block percentages in the form of a pie chart which tells you the approximate number of questions from each block. For example, 18% of the questions on the Sprinkler System Installer Exam will be based on Block A.

![Pie Chart](image)

<table>
<thead>
<tr>
<th>Block</th>
<th>Title</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Common Occupational Skills</td>
<td>18%</td>
</tr>
<tr>
<td>B</td>
<td>Water Supply Installation</td>
<td>13%</td>
</tr>
<tr>
<td>C</td>
<td>Piping Installation</td>
<td>29%</td>
</tr>
<tr>
<td>D</td>
<td>Installation of Detection, Protection and Control Systems</td>
<td>25%</td>
</tr>
<tr>
<td>E</td>
<td>Service of Fire Protection Systems</td>
<td>15%</td>
</tr>
</tbody>
</table>
Exam Breakdown

The **Sprinkler System Installer** exam currently has 120 questions. The following table shows a breakdown of the number of questions that come from each NOA block. It is important to note that the exact number of questions can change at any time. When you are ready to write your exam, you may contact your regional office to verify the number of questions (See Appendix A).

<table>
<thead>
<tr>
<th>Block A</th>
<th>Common Occupational Skills</th>
<th># of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1</td>
<td>Uses and maintains tools and equipment</td>
<td>22</td>
</tr>
<tr>
<td>Task 2</td>
<td>Organizes work</td>
<td>2</td>
</tr>
<tr>
<td>Task 3</td>
<td>Performs common trade activities</td>
<td>2</td>
</tr>
<tr>
<td>Task 4</td>
<td>Commissions systems</td>
<td>2</td>
</tr>
<tr>
<td><strong>Block B</strong></td>
<td><strong>Water Supply Installation</strong></td>
<td><strong>15</strong></td>
</tr>
<tr>
<td>Task 5</td>
<td>Installs underground water supplies</td>
<td>15</td>
</tr>
<tr>
<td>Task 6</td>
<td>Installs fire and booster pumps</td>
<td>15</td>
</tr>
<tr>
<td>Task 7</td>
<td>Installs private water supply systems</td>
<td>15</td>
</tr>
<tr>
<td><strong>Block C</strong></td>
<td><strong>Piping Installation</strong></td>
<td><strong>35</strong></td>
</tr>
<tr>
<td>Task 8</td>
<td>Prepares piping and fittings for installation</td>
<td>35</td>
</tr>
<tr>
<td>Task 9</td>
<td>Installs pipe and fittings</td>
<td>35</td>
</tr>
<tr>
<td>Task 10</td>
<td>Installs piping components</td>
<td>35</td>
</tr>
<tr>
<td><strong>Block D</strong></td>
<td><strong>Installation of Detection, Protection and Control Systems</strong></td>
<td><strong>30</strong></td>
</tr>
<tr>
<td>Task 11</td>
<td>Installs water-based systems</td>
<td>30</td>
</tr>
<tr>
<td>Task 12</td>
<td>Installs specialty fire suppression systems</td>
<td>30</td>
</tr>
<tr>
<td>Task 13</td>
<td>Installs detection devices</td>
<td>30</td>
</tr>
<tr>
<td>Task 14</td>
<td>Installs signal-initiating devices</td>
<td>30</td>
</tr>
<tr>
<td><strong>Block E</strong></td>
<td><strong>Service of Fire Protection Systems</strong></td>
<td><strong>18</strong></td>
</tr>
<tr>
<td>Task 15</td>
<td>Maintains and repairs fire protection systems</td>
<td>18</td>
</tr>
<tr>
<td>Task 16</td>
<td>Inspects and tests fire protection systems</td>
<td>18</td>
</tr>
</tbody>
</table>

**Total** | **120** |
NOA Sub-tasks

The following NOA Task Profile Checklist outlines the blocks, tasks and sub-tasks for your trade. The IP Red Seal exam is written to test your knowledge and abilities regarding the sub-tasks in the NOA. This chart can be used to review your current knowledge. You can review by placing a checkmark (✓) next to those you understand fully.

Place your focus on those you do not understand and study them until you are comfortable with the material. Think of possible questions in that particular content area.

The NOA also contains a list of “supporting knowledge and abilities” for each sub-task. They are the skills and knowledge you must have to perform a sub-task. The supporting knowledge and abilities identified under each sub-task will be very helpful as you review. The list can be found in the NOA for your trade.
## Task Profile Checklist
### Based on 2009 NOA
### Sprinkler System Installer

### Block A: Common Occupational Skills

#### Task 1: Uses and maintains tools and equipment
- Maintains hand tools
- Maintains portable and stationary power tools
- Maintains measuring and testing equipment
- Uses access equipment
- Uses rigging, hoisting and lifting equipment
- Uses personal protective equipment (PPE) and safety equipment

#### Task 2: Organizes work
- Interprets codes, regulations and procedures
- Interprets blueprints and specifications
- Uses documentation and reference material
- Communicates with others
- Plans daily job tasks and procedures
- Maintains safe work environment

#### Task 3: Performs common trade activities
- Prepares work site
- Handles materials and supplies
- Installs supports and hangers
- Performs layout of systems

#### Task 4: Commissions systems
- Commissions water supply systems
- Commissions piping installation
- Commissions detection, protection and control systems
Block B: Water Supply Installation

Task 5: Installs underground water supplies

- Supervises trenching and backfilling
- Installs underground piping and components
- Flushes underground system

Sub-Tasks

Task 6: Installs fire and booster pumps

- Determines location of pumps, drivers, controllers and components
- Installs pumps, controllers and components

Sub-Tasks

Task 7: Installs private water supply systems

- Installs water tanks
- Installs related equipment

Sub-Tasks

Block C: Piping Installation

Task 8: Prepares piping and fittings for installation

- Cuts pipe
- Bends pipe
- Threads pipe
- Grooves pipe
- Drills pipe
- Grinds pipe
- Prepares fittings

Sub-Tasks

Task 9: Installs pipe and fittings

- Installs steel pipe and fittings
- Installs plastic pipe and fittings
- Installs copper pipe and fittings
- Paints and labels pipe

Sub-Tasks
### Block C: Piping Installation (Cont’d)

- **Task 10:** Installs piping components
  - Identifies sprinkler heads
  - Installs sprinkler heads and nozzles
  - Installs sleeves
  - Installs sway/seismic bracing
  - Installs auxiliary devices
  - Installs cross connection control assemblies

### Block D: Installation of Detection, Protection and Control Systems

- **Task 11:** Installs water-based systems
  - Installs wet systems
  - Installs dry systems
  - Installs antifreeze systems
  - Installs preaction/deluge systems
  - Installs foam systems
  - Installs standpipe systems
  - Installs water mist systems

- **Task 12:** Installs specialty fire suppression systems
  - Installs dry chemical, clean agent and carbon dioxide systems
  - Installs portable extinguishers

- **Task 13:** Installs detection devices
  - Installs wet and dry pilot lines
  - Installs heat-actuated detectors (HADs)
  - Installs spark detection systems
  - Installs air sampling systems
  - Installs electrical detection systems

- **Task 14:** Installs signal-initiating devices
  - Installs alarm-initiating devices
  - Installs supervisory-initiating devices
### Block E: Service of Fire Protection Systems

<table>
<thead>
<tr>
<th>Task 15: Maintains and repairs fire protection systems</th>
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</thead>
<tbody>
<tr>
<td>- Trouble-shoots fire protection systems</td>
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<tr>
<td>- Repairs deficiencies</td>
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<td>- Performs scheduled maintenance</td>
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<table>
<thead>
<tr>
<th>Sub-Tasks</th>
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<table>
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<tr>
<th>Task 16: Inspects and tests fire protection systems</th>
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</thead>
<tbody>
<tr>
<td>- Performs scheduled inspections</td>
</tr>
<tr>
<td>- Performs scheduled tests</td>
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<tr>
<td>- Inspects portable fire extinguishers</td>
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</tbody>
</table>
Create a Study Plan

As you prepare for your exam, it is important to plan a schedule. The following two tables will help you stay on track.

The first table is a “Weekly Study Plan.” In this table list the areas you will focus your study for each day. You should include items you need to review as well as items you need to study. Remember, more time will be needed for study in areas you find difficult, whereas you may only require review in areas you are more familiar with. As you work through the NOA sub-task list you can start to fill in this table.

The second table is a “Study Time Table.” It is important to create a study schedule where you determine the best days of the week and times of day for you to study.

Print several copies of these tables and fill out for each week of study. It is important to stick to your study schedule.
<table>
<thead>
<tr>
<th></th>
<th>Area of Study 1</th>
<th>Area of Study 2</th>
<th>Area of Study 3</th>
<th>Area of Study 4</th>
<th>Area of Study 5</th>
<th>Area of Study 6</th>
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<td>7:00 PM - 8:00 PM</td>
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</tbody>
</table>
Resources - Websites

Study information can be drawn from a variety of sources. A sample list of study materials (websites and books) is provided below. These and other helpful resources may be found in a local college bookstore, on the internet, or at your place of employment. You may also be able to borrow them from an apprentice or journeyperson in your trade.

Study Strategies and Exam Preparation Guide

The Study Strategies & Exam Preparation Guide is meant to be used in conjunction with this study guide. It provides direction and information on such areas as study habits, test preparation and test taking techniques.


Plan of Training (POT)

A Provincial Plan of Training details the full scope of learning for a particular occupation, including both technical training competencies and industry experiences necessary to write an IP Red Seal exam (and complete the requirements for Red Seal Certification), or to write a provincial examination. The Plan of Training is based on the NOA.

POT Website:  [www.ed.gov.nl.ca/app/plans.html](http://www.ed.gov.nl.ca/app/plans.html)

Red Seal Website

National Occupational Analysis - The NOA is a document used for Red Seal trades that describes the knowledge and abilities required by a fully competent tradesperson working in that trade. The content for the IP exam is based on the NOA.

Red Seal Website:  [www.red-seal.ca](http://www.red-seal.ca)

Sprinkler System Installer PRACTICE Exam

This is NOT an IP exam. This is a practice exam provided by the Inter-provincial Standards Red Seal Program. It was developed using similar question types to that of a Red Seal exam. The exam is intended to be used for self-assessment in preparation for writing an IP Exam.

Practice Exam Website:
[www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=221](http://www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=221)

Glossary of Terms

The Red Seal website also lists a Glossary of Terms in the National Occupational Analysis Guide which will be helpful in preparing for your IP exam:
[www.red-seal.ca/trades/sprinklersysinstal/2009n.4.1_.1ppb_gl.4ss.1ry-eng.html](http://www.red-seal.ca/trades/sprinklersysinstal/2009n.4.1_.1ppb_gl.4ss.1ry-eng.html)
Resources – Book List

The books listed below are sorted according to NOA blocks as referenced throughout this study guide. You can use this list to help you obtain information on specific topics. It is not necessary to use these books specifically, as you may find others that will be equally beneficial.

<table>
<thead>
<tr>
<th>BOOK</th>
<th>BLOCKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALBERTA MODULES</strong></td>
<td></td>
</tr>
<tr>
<td>(1) Specialty Pipe Ends and Fittings – 370102g</td>
<td>✓</td>
</tr>
<tr>
<td>(2) Grades of Hanger calculation – 370205e</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(3) Introduction to Electricity – 370305c</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(4) Introduction to Fire Alarm Panels – 370304c</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(5) Water Properties and Flow – 370205c</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(6) Portable Fire Extinguishers – 370201a</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(7) Industrial Fire Protection Systems – 070403d</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(8) Threaded Pipe – 070102a</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(9) Power Tools – 070104b</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>(10) Valves – 070102e</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Use and Care of Tools</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>Rigging</td>
<td>✓ ✓ ✓</td>
</tr>
<tr>
<td>IPT’s International Pipe Trades Handbook</td>
<td>✓ ✓ ✓</td>
</tr>
</tbody>
</table>

If you wish to obtain any of the resources listed above, here is the reference information:

- **Alberta Modules, # 1 through #10**, Northern Alberta Institute of Technology, Alberta,
- **Use and Care of Tools**, 1st edition, 1972, United Association Education
- **Rigging**, 1972, United Association Education
Disclaimer

Various external resources (websites, textbooks) have been listed in this study guide to assist an individual in preparing to write an IP Red Seal Exam. This does not mean the Department of Advanced Education, Skills and Labour, Newfoundland and Labrador endorses the material or that these are recommended as the best resources. There may be other resources of equal or greater value to an individual preparing for an IP Red Seal exam. The Department of Advanced Education, Skills and Labour has no control over the content of external textbooks and websites listed, and no responsibility is assumed for the accuracy of the material.

Conclusion

We hope this guide has provided you with some useful tools as you prepare for your IP Red Seal exam. If you have any questions regarding your IP Red Seal exam please contact your regional office (see Appendix A for a list of regional offices).

We appreciate your comments and feedback regarding the usefulness of this study guide. If you have any comments or suggestions, we welcome your feedback. The feedback form at the end of this guide can be used for this purpose.
Appendix A: Regional Offices

If you have any questions regarding your IP Red Seal exam, please contact one of the following regional offices:

Department of Advanced Education, Skills and Labour  
Apprenticeship and Trades Certification Division  
Toll Free: 1-877-771-3737  
www.ed.gov.nl.ca/app/

<table>
<thead>
<tr>
<th>Corner Brook</th>
<th>Grand Falls-Windsor</th>
<th>Clarenville</th>
<th>St. John’s</th>
<th>Happy Valley – Goose Bay</th>
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<td>42 Hardy Avenue</td>
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<td>P.O. Box 8700</td>
<td>163 Hamilton River Road</td>
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<tr>
<td>Corner Brook, NL</td>
<td></td>
<td>Telephone: (709) 637-2366</td>
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<td>Facsimile: (709) 637-2519</td>
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<td>Telephone: (709) 466-3982</td>
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<td>Facsimile: (709) 466-3987</td>
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<td>163 Hamilton River Road</td>
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Appendix B: Calculator Use

The picture below shows a calculator with the same functions as the one you will be provided with during your exam. It is advisable to borrow or purchase one with similar functions so that you can familiarize yourself with it before you write your exam.
Appendix C: Answer Sheet Example

With your exam you will be given an answer sheet similar to the one below. When answering multiple choice questions be sure to fill the circle completely and fill the circle that corresponds to the question on the exam.
Feedback Form
Study Guide – Sprinkler System Installer

Please answer the following:

(1) This Study Guide is a useful tool for exam preparation.
☐ strongly agree ☐ agree ☐ disagree ☐ strongly disagree

(2) The topics contained in the guide are arranged in a logical order.
☐ strongly agree ☐ agree ☐ disagree ☐ strongly disagree

(3) The design and format of the guide caught my attention.
☐ strongly agree ☐ agree ☐ disagree ☐ strongly disagree

(4) The instructions throughout the guide are clear and to the point.
☐ strongly agree ☐ agree ☐ disagree ☐ strongly disagree

(5) The resources listed in this guide are suitable and valuable.
☐ strongly agree ☐ agree ☐ disagree ☐ strongly disagree

(6) The guide should contain more information.
☐ strongly agree ☐ agree ☐ disagree ☐ strongly disagree

Suggested information/resources to include:

_________________________________________________________________
_________________________________________________________________

Additional Comments:

_________________________________________________________________
_________________________________________________________________

Please complete this form and return via fax or mail to the following:
Department of Advanced Education, Skills and Labour
Apprenticeship and Trades Certification Division
Standards and Curriculum Unit
45 Tilley’s Road, Clarenville, NL A5A 1Z4
Fax: (709) 466-3987