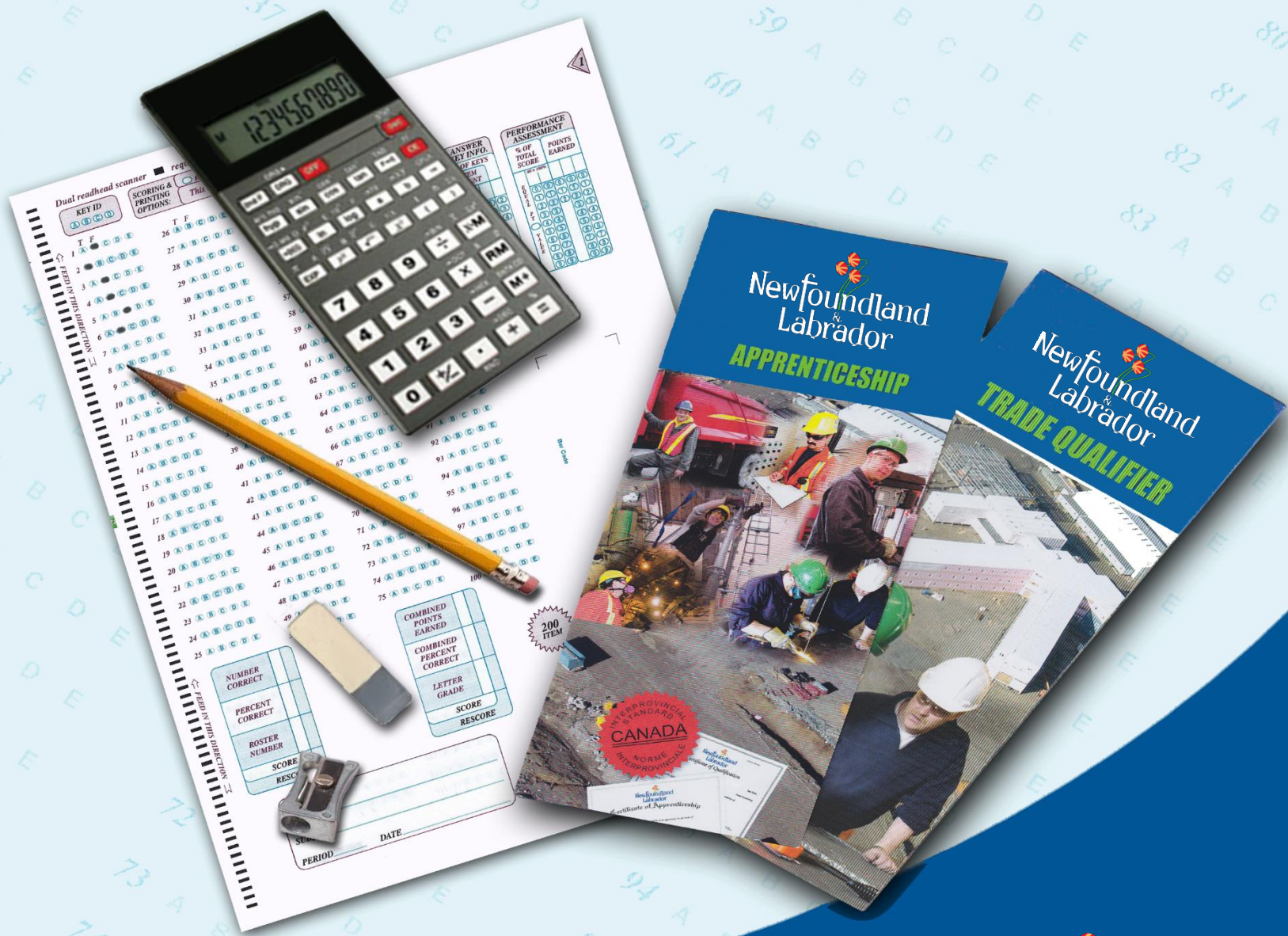


# APPRENTICESHIP & CERTIFICATION

## Study Guide Refrigeration & Air Conditioning Mechanic



**Apprenticeship and Certification**

**Study Guide**

# **Refrigeration and Air Conditioning Mechanic**

**(Based on Red Seal Occupational Standard – RSOS 2019)**

Government of Newfoundland and Labrador  
Department of Immigration, Population Growth and Skills

**Version 10**

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## Introduction

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This Study Guide has been developed by the Newfoundland and Labrador Department of Immigration, Population Growth and Skills, Apprenticeship and Trades Certification Division, to assist apprentices and trade qualifiers as they prepare to write the Inter-provincial (IP) Red Seal Exam. IP Exams are available for all Red Seal trades. For a list of Inter-provincial trades please refer to the Department of Immigration, Population Growth and Skills website:

<https://www.gov.nl.ca/atcd/designated-trades/list-of-designated-trades/>

### **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

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### 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 Apprenticeship Program Officer (APO) 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

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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.

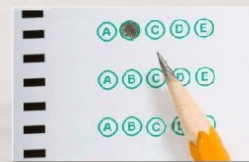
### Level 3 Critical Thinking

Questions at this level test your ability to interpret data, solve problems and arrive at valid conclusions.

On the following pages, examples of each of the three types of questions are provided.

#### Level 1 Examples:

1. When constructing a walk-in freezer box, where is the installation of the vapor barrier present?
  - A. Inside on the coldest side.
  - B. Outside on the warmest side.
  - C. Around door sill only.
  - D. Only required in floor and ceiling construction.



2. What is an indication of a plugged metering device?

- A. High suction pressure.
- B. High suction gas superheat.
- C. No condenser subcooling.
- D. High discharge gas temperature.



3. What is the principal function of the expansion tank in a hot water system?

- A. It allows the volume of the water in the system to change to maintain working pressure.
- B. It collects the air in the system, thus preventing air lock of the system while in operation.
- C. It provides the necessary space for the air required in the system.
- D. It acts as a safety chamber in case of over firing of the boiler.



### Level 2 Examples:

1. What amperage capacity should the supply wiring be rated for a refrigerated fixture which has a 208V power supply and the following loads?

- 4 Evaporator fan motors rated at 9 W each
- 2 Defrost heaters rated at 6 A each
- 6 Fluorescent lights rated at 40 W each
- 1 strip mullion heater rated at 3 A

- A. 15 A.
- B. 20 A.
- C. 30 A.
- D. 40 A.



2. When testing a compressor motor winding with a megger, what reading would indicate a good clean system?
- A. 2000 megaohms.
  - B. 0.0002 megaohms.
  - C. Zero megaohms.
  - D. Infinity.

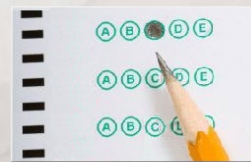


3. Which three instruments are required to check the calibration of an enthalpy control on the economizer of a rooftop air conditioning unit?
- A. Voltmeter, ammeter and ohmmeter.
  - B. Manometer, Pitot tube and thermometer.
  - C. Draft gauge, manometer and thermometer.
  - D. Thermometer, sling psychrometer and ultrameter.



**Level 3 Examples:**

1. What is the minimum required sleeve size when installing a 50 mm (2 in.) nominal pipe with 38 mm (1 ½ in.) insulation through a 200 mm (8 in.) concrete block exterior wall?
- A. 50 mm/2 in.
  - B. 100 mm/4 in.
  - C. 150 mm/6 in.
  - D. 200 mm/8 in.





2. What is the cooling capacity of a water chiller operating with a 4.4°C (40°F) evaporating temperature, return water temperature of 10°C (50°F) and a 7.2°C (45°F) supply water temperature if the water flow rate is measured at 682.5 L/min (150 gal./min)?

- A. 87 000 W/ 300 000 Btu/h.
- B. 109 875 W/ 375 000 Btu/h.
- C. 131 850 W/ 450 000 Btu/h.
- D. 153 825 W/ 525 000 Btu/h.



3. When diagnosing the motor windings of a hermetic compressor, the following values are noted:

Common-to-start: 18 $\Omega$

Start-to-run 21 $\Omega$

What should the common-to-run value be?

- A. 3 $\Omega$ .
- B. 18 $\Omega$ .
- C. 21 $\Omega$ .
- D. 39 $\Omega$ .



**Source of Questions:**

[www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=202](http://www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=202)

## Exam Content

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### Understanding the *Red Seal Occupational Standard (RSOS)*

The Red Seal model has historically been based on the development of the National Occupational Analysis (NOA) which supports the development of multiple-choice format examinations.

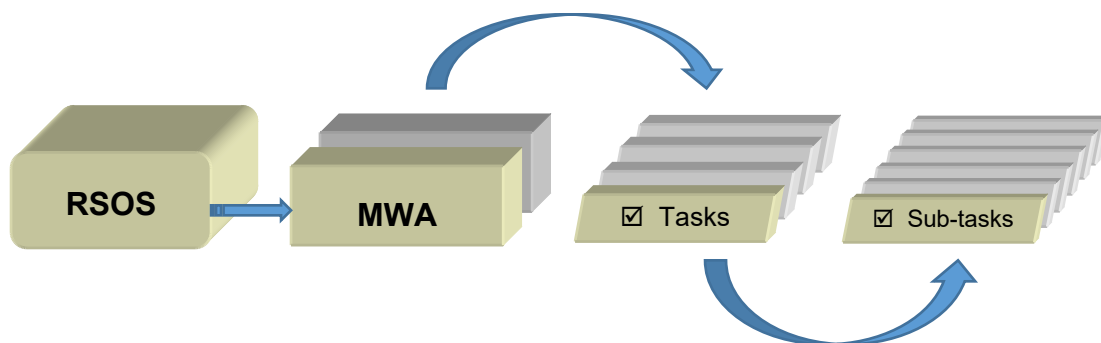
The RSOS was introduced in 2015 and is now taking the place of the NOA. Each RSOS or NOA sets the standard for a Red Seal trade. The Red Seal Inter-provincial Examination is based on the Red Seal Standard.

The new standards provide greater consistency in learning resources and allow for increased industry involvement in the development of these standards. This new model places increases emphasis on apprenticeship training and assessing skills with industry learning objectives, outcomes and performance criteria.

The RSOS for each trade describes the tasks and sub-tasks; skills and knowledge requirements; summary of essential skills; safety information; trends affecting the trade; technical terms; names of tools and equipment; acronyms; learning objectives and outcomes; industry expected performance and essential skills related to each sub-task.

The RSOS is an excellent tool to use as you study for the Red Seal exam. RSOSs can be found at <http://www.red-seal.ca/resources/n.4.1-eng.html>

RSOS material is organized into the following categories: **MWA (Major Working Activity)**. The MWAs are further broken down into **TASKS** (*describes activities within an MWA*) and **SUB-TASKS** (*describe activities within a task – This is what the exam is based on*).

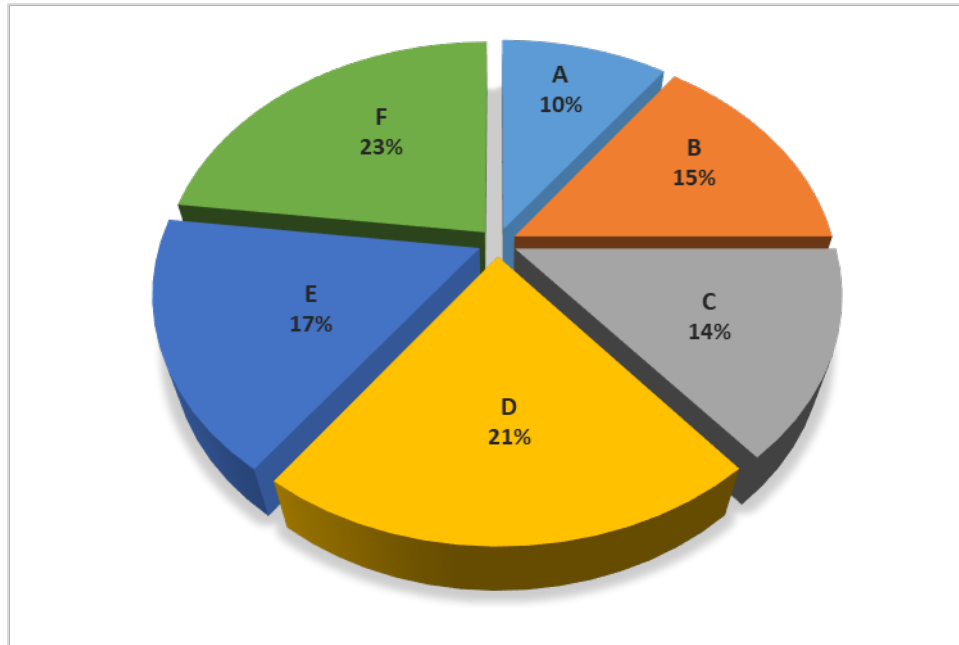


The NOA will continue to be used as the occupational standard for trades that do not yet have an RSOS developed.

## RSOS Pie Chart

The RSOS Pie Chart presents the MWA percentages in the form of a pie chart which tells you the approximate number of questions from each MWA. For example, 10% of the questions on the **Refrigeration and Air Conditioning Mechanic** Exam will be based on **MWA A**.

**Refrigeration and Air Conditioning Mechanic**



| MWA TITLES   |                                     |              |                                   |
|--------------|-------------------------------------|--------------|-----------------------------------|
| <b>MWA A</b> | Performs Common Occupational Skills | <b>MWA D</b> | Performs Installation             |
| <b>MWA B</b> | Performs Routine Trade Activities   | <b>MWA E</b> | Performs Commissioning            |
| <b>MWA C</b> | Plans Installation                  | <b>MWA F</b> | Performs Maintenance and Services |

## Exam Breakdown

The **Refrigeration and Air Conditioning Mechanic** IP Red Seal Exam has 125 questions. The following table shows a breakdown of the approximate number of questions that come from each RSOS MWA. It is important to note that the 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).

|                |   | # of Questions |
|----------------|---|----------------|
| <b>MWA A</b>   | <b>Performs Common Occupational Skills</b>  | <b>13</b>      |
| <b>Task 1</b>  | Performs safety related functions           |                |
| <b>Task 2</b>  | Uses tools and equipment                    |                |
| <b>Task 3</b>  | Organizes work                              |                |
| <b>Task 4</b>  | Uses communication and mentoring techniques |                |
| <b>MWA B</b>   | <b>Performs Routine Trade Activities</b>    | <b>19</b>      |
| <b>Task 5</b>  | Performs work site preparation              |                |
| <b>Task 6</b>  | Performs trade activities                   |                |
| <b>MWA C</b>   | <b>Plans Installation</b>                   | <b>18</b>      |
| <b>Task 7</b>  | Plans installation of HVAC/R systems        |                |
| <b>Task 8</b>  | Plans installation of control systems       |                |
| <b>MWA D</b>   | <b>Performs Installation</b>                | <b>26</b>      |
| <b>Task 9</b>  | Installs HVAC/R systems                     |                |
| <b>Task 10</b> | Installs control systems                    |                |
| <b>MWA E</b>   | <b>Performs Commissioning</b>               | <b>21</b>      |
| <b>Task 11</b> | Commissions HVAC/R systems                  |                |
| <b>Task 12</b> | Commissions control systems                 |                |
| <b>MWA F</b>   | <b>Performs Maintenance and Service</b>     | <b>28</b>      |
| <b>Task 13</b> | Maintains HVAC/R systems                    |                |
| <b>Task 14</b> | Services HVAC/R systems                     |                |
| <b>Task 15</b> | Maintains and services control systems      |                |
|                | <b>Total</b>                                | <b>125</b>     |

## RSOS Sub-tasks

The following *RSOS Task Profile Checklist* outlines the MWAs, 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 RSOS. 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 RSOS 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 RSOS for your trade.

# Task Profile Checklist

## Based on 2019 RSOS

### Refrigeration and Air Conditioning Mechanic

#### MWA A: Performs Common Occupational Skills

**Task 1: Performs Safety Related Functions**

- Sub-Tasks*
- Maintains safe work environment
  - Performs lock-out, tag-out and isolation procedures
  - Uses personal protection equipment (PPE) and safety equipment

**Task 2: Uses Tools and Equipment**

- Sub-Tasks*
- Uses hand tools
  - Uses portable and stationary power tools
  - Uses brazing and soldering equipment
  - Uses recovery and recycling tools and equipment
  - Uses evacuation tools and equipment
  - Uses charging tools and equipment
  - Uses diagnostic and measuring tools and equipment
  - Uses access equipment
  - Uses rigging, hoisting and lifting equipment
  - Uses digital technology

**Task 3: Organizes Work**

- Sub-Tasks*
- Interprets drawings and specifications
  - Uses documentation and reference material
  - Plans job tasks and procedures

**Task 4: Uses Communication and Mentoring Techniques**

- Sub-Tasks*
- Uses communication techniques
  - Uses mentoring techniques

## MWA B: Performs Routine Trade Activities

### Task 5: Performs Work Site Preparation

Sub-Tasks

- Prepares work site
- Handles materials and supplies

### Task 6: Performs Routine Trade Activities

Sub-Tasks

- Performs brazing and soldering
- Performs leak and pressure tests on system
- Evacuates systems
- Uses refrigerants, gases and oils
- Performs field wiring of systems
- Applies sealants and adhesives

## MWA C: Plans Installation

### Task 7: Plans Installation of HVAC/R Systems

Sub-Tasks

- Verifies HVAC/R system parameters and requirements
- Selects HVAC/R equipment, components and accessories
- Determines placement of HVAC/R equipment, components and accessories
- Performs HVAC/R material take-off

### Task 8: Plans Installation of Control Systems

Sub-Tasks

- Verifies control system parameters and requirements
- Selects control system components and accessories
- Determines placement of control system components and accessories
- Performs control system material take off

## MWA D: Performs Installation

### Task 9: Installs HVAC/R Systems

#### Sub-Tasks

- Confirms system layout
- Assembles HVAC/R equipment, components and accessories
- Places HVAC/R equipment, components and accessories
- Installs fastener, brackets and hangers
- Installs HVAC/R piping and tubing
- Applies HVAC/R holding charge

### Task 10: Installs Control Systems

#### Sub-Tasks

- Places control system components
- Connects control systems

## MWA E: Performs Commissioning

### Task 11: Commissions HVAC/R Systems

#### Sub-Tasks

- Performs pre start-up checks HVAC/R systems
- Performs Start-up of HVAC/R systems
- Completes HVAC/R system charge
- Sets up primary and secondary HVAC/R system components

### Task 12: Commissions Control Systems

#### Sub-Tasks

- Performs start-up checks for control systems
- Verifies/sets operating parameters



## MWA F: Performs Maintenance and Service

### Task 13: Maintains HVAC/R Systems

#### Sub-Tasks

- Inspects HVAC/R systems
- Performs predictive and scheduled maintenance on HVAC/R systems
- Tests HVAC/R system components and accessories

### Task 14: Services HVAC/R Systems

#### Sub-Tasks

- Troubleshoots HVAC/R systems
- Repairs HVAC/R systems

### Task 14: Maintains and Services Control Systems

#### Sub-Tasks

- Performs maintenance and inspection on control systems
- Troubleshoots control systems
- Calibrates operating and safety controls
- Repairs control systems

## Create a Study Plan

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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 RSOS 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.

**Weekly Study Plan for Week of:** \_\_\_\_\_

|       | Area of Study 1 | Area of Study 2 | Area of Study 3 | Area of Study 4 | Area of Study 5 | Area of Study 6 |
|-------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Mon.  |                 |                 |                 |                 |                 |                 |
| Tues. |                 |                 |                 |                 |                 |                 |
| Wed.  |                 |                 |                 |                 |                 |                 |
| Thu.  |                 |                 |                 |                 |                 |                 |
| Fri.  |                 |                 |                 |                 |                 |                 |
| Sat.  |                 |                 |                 |                 |                 |                 |
| Sun.  |                 |                 |                 |                 |                 |                 |

**Study Time Table for Week of:** \_\_\_\_\_

|                       | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-----------------------|--------|---------|-----------|----------|--------|----------|--------|
| 8:00 AM - 9:00 AM     |        |         |           |          |        |          |        |
| 9:00 AM - 10:00 AM    |        |         |           |          |        |          |        |
| 10:00 AM - 11:00 AM   |        |         |           |          |        |          |        |
| 11:00 AM - 12:00 Noon |        |         |           |          |        |          |        |
| 12:00 Noon - 1:00 PM  |        |         |           |          |        |          |        |
| 1:00 PM - 2:00 PM     |        |         |           |          |        |          |        |
| 2:00 PM - 3:00 PM     |        |         |           |          |        |          |        |
| 3:00 PM - 4:00 PM     |        |         |           |          |        |          |        |
| 4:00 PM - 5:00 PM     |        |         |           |          |        |          |        |
| 5:00 PM - 6:00 PM     |        |         |           |          |        |          |        |
| 6:00 PM - 7:00 PM     |        |         |           |          |        |          |        |
| 7:00 PM - 8:00 PM     |        |         |           |          |        |          |        |

## Resources - Websites

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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 journey person 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.

<https://www.gov.nl.ca/atcd/apprentices-youth/self-study/study-guides/>

### 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 RSOS.

<https://www.gov.nl.ca/atcd/designated-trades/pots-aacs/>

### Red Seal Website

**Red Seal** is a program that sets common standards to evaluate the skills of tradespeople across Canada. It is a partnership between the Federal Government and the provinces/territories.

The Red Seal model has been based on the National Occupational Analyses (NOA) which supports the development of multiple-choice examinations. A new Red Seal Occupational Standard (RSOS) was introduced in 2019 and is taking the place of the NOA.

<http://www.red-seal.ca/>

### Refrigeration and Air Conditioning Mechanic 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.

<http://www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=202>

### Red Seal Exam Self-Assessment Guide

Use this self-assessment tool to rate your own understanding and experience with the tasks of the trade that are on the Red Seal examination:

[https://www.red-seal.ca/\\_conf/assets/custom/docms/refridgacmech/self-assessment.pdf](https://www.red-seal.ca/_conf/assets/custom/docms/refridgacmech/self-assessment.pdf)

### Glossary of Terms

The Red Seal website lists a Glossary of Terms which will be helpful in preparing for your IP exam!

[http://www.red-seal.ca/trades/refridgacmech/2019rs.4s\\_1ppc\\_gl.4ss.1ry-eng.html](http://www.red-seal.ca/trades/refridgacmech/2019rs.4s_1ppc_gl.4ss.1ry-eng.html)

### Acronyms

The Red Seal website lists Acronyms which will be helpful in preparing for your IP exam:

[http://www.red-seal.ca/trades/refridgacmech/2019rs.4s\\_1pp.1\\_1cr.4nym-eng.html](http://www.red-seal.ca/trades/refridgacmech/2019rs.4s_1pp.1_1cr.4nym-eng.html)

### List of Tools and Equipment

The Red Seal website shows a list of Tools and Equipment which will be helpful in preparing for your IP exam:

[http://www.red-seal.ca/trades/refridgacmech/2019rs.4s\\_1ppb\\_t.4.4ls-eng.html](http://www.red-seal.ca/trades/refridgacmech/2019rs.4s_1ppb_t.4.4ls-eng.html)

## Resources – Book List

The books listed below are sorted according to RSOS MWAs 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.

| Book   | MWA<br>A | MWA<br>B | MWA<br>C | MWA<br>D | MWA<br>E |
|--|----------|----------|----------|----------|----------|
| <i>Modern Refrigeration and Air Conditioning</i> , 18 <sup>th</sup> edition                            | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Modern Refrigeration and Air Conditioning</i> , 1 <sup>st</sup> edition                             | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Refrigeration &amp; Air Conditioning Technology</i> , 4 <sup>th</sup> edition                       | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Heating and Cooling Essentials</i>  | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Ozone Depleting Substance Regulations</i>   | ✓        |          |          |          |          |
| <i>Electricity and Controls for HVAC/R</i> , 4 <sup>th</sup> edition                                   | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Practical Problems in Mathematics for Heating and Cooling Technicians</i> , 4 <sup>th</sup> edition | ✓        |          |          |          |          |
| <i>Mechanical Refrigeration Code B52-05</i>  | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Canadian Electrical Code Part I 2009 W/Pocket guide</i>   | ✓        | ✓        | ✓        | ✓        | ✓        |
| <i>Blueprints and Plans for HVAC</i> , 3 <sup>rd</sup> edition   | ✓        |          |          |          |          |
| <i>BTU Buddy</i>   |          |          |          |          | ✓        |
| <i>Understanding Electricity and Wiring Diagrams</i> , 1 <sup>st</sup> edition                         |          | ✓        | ✓        | ✓        | ✓        |
| <i>Guide to the HVAC/R Certification and Competency Tests</i> , 2 <sup>nd</sup> edition                | ✓        | ✓        | ✓        | ✓        | ✓        |

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

- Modern Refrigeration and Air Conditioning*, 18<sup>th</sup> edition, Althouse, A.D., Bracciano, A.F., and Turnquist, C.H., ISBN
- Modern Refrigeration and Air Conditioning*, 1<sup>st</sup> edition, McGraw-Hill Professional, 1988, Althouse, A.D., ISBN 978-0830628810
- Refrigeration & Air Conditioning Technology*, 4<sup>th</sup> edition, Delmar Cengage Learning, 1999, Johnson, B., ISBN 978-0766806672
- Heating and Cooling Essentials*, Goodheart Wilcox, Killinger, J. and Killinger, L., ISBN 978-1566374330
- Ozone Depleting Substance Regulations*, Environmental Act (O.C. 97-635), Newfoundland Regulations 120/97, [www.assembly.nl.ca/legislation/sr/annualregs/1997/Nr970120.htm](http://www.assembly.nl.ca/legislation/sr/annualregs/1997/Nr970120.htm)
- Electricity and Controls for HVAC/R*, 4<sup>th</sup> edition, Delmar Cengage Learning, 2000, Herman, S., and Sparkman, B., ISBN 978-0766817388
- Practical Problems in Mathematics for Heating and Cooling Technicians*, 4<sup>th</sup> edition, Delmar Cengage Learning, 2004, Devore, R. B., ISBN 978-1401841775
- Mechanical Refrigeration Code B52-05*, Canadian Standards Association, 2005, Product ID 2018325
- Canadian Electrical Code Part I 2009 W/Pocket guide*, Canadian Standards Association, 21<sup>st</sup> edition,
- Blueprints and Plans for HVAC*, 3<sup>rd</sup> edition, Moeavek, ISBN 978-1428335202
- BTU Buddy*, ISBN 978-1428324282
- Understanding Electricity and Wiring Diagrams*, 1<sup>st</sup> edition, ISBN 0-13-517897-5
- Guide to the HVAC/R Certification and Competency Tests*, 2<sup>nd</sup> edition, Featherstone and Riojas, ISBN 0-13-114949-0

## 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 Immigration, Population Growth and Skills, 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 Immigration, Population Growth and Skills has no control over the content of external textbooks and websites listed, and no responsibility is assumed for the accuracy of the material.

## Conclusion

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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

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

Department of Immigration, Population Growth and Skills  
Apprenticeship and Trades Certification Division  
Toll Free: 1-877-771-3737

<https://www.gov.nl.ca/atcd/contact-us/staff-listing-and-office-locations/>

### Corner Brook

1-3 Union Street  
Aylward Building, 2<sup>nd</sup> Floor  
Corner Brook, NL A2H 5M7

Telephone: (709) 637-2366  
Facsimile: (709) 637-2519

### Grand Falls-Windsor

42 Hardy Avenue  
Grand Falls-Windsor, NL  
A2A 2J9

Telephone: (709) 292-4215  
Facsimile: (709) 292-4502

### Clarenville

45 Tilley's Road  
Clarenville, NL  
A5A 1Z4

Telephone: (709) 466-3982  
Facsimile: (709) 466-3987

### St. John's

P.O. Box 8700  
1170 Topsail Road  
Mount Pearl, NL A1B 4J6

Telephone: (709) 729-2729  
Facsimile: (709) 729-5878

### Happy Valley – Goose Bay

163 Hamilton River Road  
Bursey Building  
Happy Valley – Goose Bay, NL  
A0P 1E0

Telephone: (709) 896-6348  
Facsimile: (709) 896-3733



## Appendix B: Calculator Use

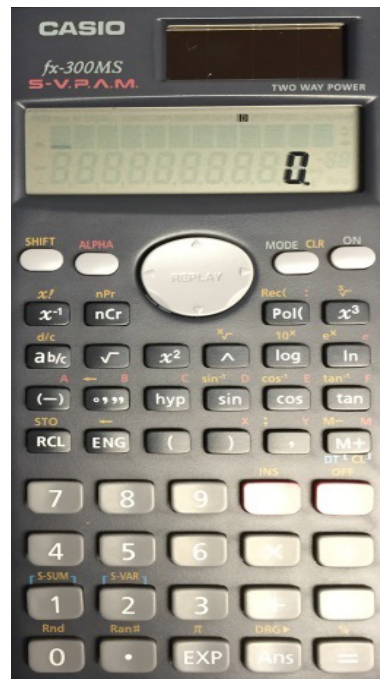
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The picture below shows a calculator with the same functions as the one you will be provided with during your exam. It is advisable to borrow or purchase one with similar functions so that you can familiarize yourself with it before you write your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

**Casio FX-260**



**Casio FX-300 MS**



# Appendix C: Answer Sheet Example

With your exam you will be given an answer sheet like 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.

Dual readhead scanner  required  to score this sheet

KEY ID  
 A  B  C  D

SCORING & PRINTING OPTIONS:  
 RESCORE  MULTIPLE ANSWER SCORING  
 This sheet always uses the "Total Only" scoring option.

1 T F 1 A B C D E 26 T F 26 A B C D E 51 T F 51 A B C D E 76 T F 76 A B C D E  
 2 A B C D E 27 A B C D E 52 A B C D E 77 A B C D E  
 3 A B C D E 28 A B C D E 53 A B C D E 78 A B C D E  
 4 A B C D E 29 A B C D E 54 A B C D E 79 A B C D E  
 5 A B C D E 30 A B C D E 55 A B C D E 80 A B C D E  
 6 A B C D E 31 A B C D E 56 A B C D E 81 A B C D E  
 7 A B C D E 32 A B C D E 57 A B C D E 82 A B C D E  
 8 A B C D E 33 A B C D E 58 A B C D E 83 A B C D E  
 9 A B C D E 34 A B C D E 59 A B C D E 84 A B C D E  
 10 A B C D E 35 A B C D E 60 A B C D E 85 A B C D E  
 11 A B C D E 36 A B C D E 61 A B C D E 86 A B C D E  
 12 A B C D E 37 A B C D E 62 A B C D E 87 A B C D E  
 13 A B C D E 38 A B C D E 63 A B C D E 88 A B C D E  
 14 A B C D E 39 A B C D E 64 A B C D E 89 A B C D E  
 15 A B C D E 40 A B C D E 65 A B C D E 90 A B C D E  
 16 A B C D E 41 A B C D E 66 A B C D E 91 A B C D E  
 17 A B C D E 42 A B C D E 67 A B C D E 92 A B C D E  
 18 A B C D E 43 A B C D E 68 A B C D E 93 A B C D E  
 19 A B C D E 44 A B C D E 69 A B C D E 94 A B C D E  
 20 A B C D E 45 A B C D E 70 A B C D E 95 A B C D E  
 21 A B C D E 46 A B C D E 71 A B C D E 96 A B C D E  
 22 A B C D E 47 A B C D E 72 A B C D E 97 A B C D E  
 23 A B C D E 48 A B C D E 73 A B C D E 98 A B C D E  
 24 A B C D E 49 A B C D E 74 A B C D E 99 A B C D E  
 25 A B C D E 50 A B C D E 75 A B C D E 100 A B C D E

ANSWER KEY INFO.  
 # OF KEYS  
 ITEM COUNT  
 0 1 2  
 1 1 1 3  
 2 2 2 4  
 3 3  
 4 4  
 5 5  
 6 6  
 7 7  
 8 8  
 9 9

PERFORMANCE ASSESSMENT  
 % OF TOTAL SCORE  
 100 = 100%  
 POINTS EARNED  
 0 1 2  
 1 1 1 1 1 1  
 2 2 2 2 2 2 2  
 3 3 3 3 3 3  
 4 4 4 4 4 4  
 5 5 5 5 5 5  
 6 6 6 6 6 6  
 7 7 7 7 7 7  
 8 8 8 8 8 8  
 9 9 9 9 9 9

Bar Code

NUMBER CORRECT  
 PERCENT CORRECT  
 ROSTER NUMBER  
 SCORE  
 RESCORE

COMBINED POINTS EARNED  
 COMBINED PERCENT CORRECT  
 LETTER GRADE  
 SCORE  
 RESCORE

200 ITEM

MARKING INSTRUCTIONS  
 Use a No. 2 Pencil  
 Fill oval completely  
 Erase cleanly

STUDENT ID NUMBER  
 0 1 2 3 4 5 6 7 8 9  
 1 1 1 1 1 1 1 1 1 1  
 2 2 2 2 2 2 2 2 2 2  
 3 3 3 3 3 3 3 3 3 3  
 4 4 4 4 4 4 4 4 4 4  
 5 5 5 5 5 5 5 5 5 5  
 6 6 6 6 6 6 6 6 6 6  
 7 7 7 7 7 7 7 7 7 7  
 8 8 8 8 8 8 8 8 8 8  
 9 9 9 9 9 9 9 9 9 9

NAME \_\_\_\_\_  
 SUBJECT \_\_\_\_\_  
 PERIOD \_\_\_\_\_ DATE \_\_\_\_\_

**Feedback Form**  
**Study Guide – Refrigeration and Air Conditioning Mechanic**

Please answer the following:

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- (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:

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Additional Comments:

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**Please complete this form and return via fax or mail to the following:**

Department of Immigration, Population Growth and Skills  
Apprenticeship and Trades Certification Division  
Standards and Curriculum Unit  
45 Tilley's Road, Clarenville, NL A5A 1Z4  
Fax: (709) 466-3987

