

Apprenticeship Core Competence Statements

Refrigeration and Air Conditioning Mechanic



Apprenticeship
and Industry
Training





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Core competence statements

Apprenticeship and Industry Training (AIT) defines the core competences as the capabilities needed for each profession. AIT works with subject matter experts from across Alberta, including individuals from industry, associations, trade organizations and post-secondary institutions, to identify the core competences for each designated trade.

Breakdown of core competence statements

Core competence statements

These are a catalogue of specific undertakings, requiring essential skills, knowledge, activities or functions for a person to be deemed proficient in their trade.

Section title

Each section's heading has a title that provides a heading and overview of the content. It is crafted from tasks found within a trade's Board Order.

Competence statement

An observable major task, work activity or outcome that an entry-level journeyperson performs.

Competences

The skills and knowledge demonstrated on-the-job and in classroom instruction that supports achievement of the competence statement by an apprentice or journeyperson in their skilled trade.

Profile

A profile for an apprenticeship education program in Alberta outlines the specific skills, knowledge, abilities and behaviours necessary to work in a profession. The profile consists of a set of core competence statements, a curriculum guide, a record book and supporting documents.

NOTE: These documents are available on the Apprenticeship and Industry Training website tradesecrets.alberta.ca.



Refrigeration and Air Conditioning Mechanic trade

Refrigeration and air conditioning mechanics install, maintain, repair and overhaul industrial, commercial and residential refrigeration and air conditioning systems and their component parts. At installation sites, refrigeration and air conditioning mechanics:

- work from drawings or verbal instructions to mount or place system components,
- assemble and install refrigeration or air conditioning systems and components,
- install and calibrate related controls (including wiring), and
- start up systems, test lines to detect leaks, and record the readings taken to ensure that the system is functioning satisfactorily.

Core competences

Refrigeration and Air Conditioning Mechanic Core Competences:

1. Foundational Skills, Job Responsibilities, and Procedures
2. Air Handling
3. Refrigeration and Mechanical Cooling
4. Controls and Electrical Systems
5. Heating and Fuel Systems

Core Competence 1: Foundational Skills, Job Responsibilities and Procedures

Core Competence Statement:



Apply foundational skills essential to convey and receive critical training and workplace information.

Competences:

- Apply safety legislation, regulations & industry policy in the trades.
- Interpret codes.
- Select, use, and maintain tools and instruments.
- Interpret drawings and schematics.
- Demonstrate numeracy.
- Demonstrate communication skills.
- Demonstrate literacy and digital literacy.

Core Competence 2: Air Handling

Core Competence Statement:



Demonstrate knowledge, understanding and proficiency of air properties, air flow design, air handling systems, accessories and filtration.

Competences:

- Calculate air properties and air flow design.
- Describe air handling systems and accessories.
- Analyze air filtration.
- Describe Make-up Air systems.
- Use air instruments for system balancing.
- Calculate HVAC load requirements.
- Service HVAC and Make-up Air systems.
- Install of HVAC/R systems.
- Troubleshoot Make-up Air systems.
- Troubleshoot HVAC/R systems.
- Describe new environmental technology.

Core Competence 3: Refrigeration and Mechanical Cooling

Core Competence Statement:



Demonstrate knowledge, understanding and proficiency in refrigeration principles, the vapour compression cycle, gas laws, pressure enthalpy, valve designs, valve functions, refrigerant and oil handling.

Competences:

- Describe refrigeration principles.
- Describe vapor compression cycle.
- Apply enthalpy and gas laws.
- Identify valve design and functions.
- Demonstrate refrigerant and oil handling.
- Install and service refrigeration and mechanical cooling systems.

Competences:

- Demonstrate knowledge of components in refrigeration and mechanical cooling systems.
- Perform refrigerant changeover on refrigeration and mechanical cooling systems.
- Demonstrate knowledge on RAC systems.
- Describe ice machine operations.
- Troubleshoot HVAC/R systems.
- Demonstrate knowledge on defrost methods, circuits, and controls.
- Design and install HVAC/R piping system.
- Calculate refrigeration and air conditioning load requirements.
- Demonstrate knowledge of ultra low compression systems.
- Service industrial refrigeration systems.
- Service a chiller system.
- Service multiplex systems.
- Demonstrate knowledge of circulating pumps.

Core Competence 4: Controls and Electrical Systems**Core Competence Statement:**

Demonstrate knowledge, understanding and proficiency in electrical safety, theory, controls, components and design.

Competences:

- Use electrical safety equipment, connections, and meters.
- Demonstrate knowledge on current, voltage, and resistance.
- Apply knowledge of circuits.
- Describe methods of producing electromotive force and magnetism.
- Demonstrate fundamental knowledge of alternating current.
- Demonstrate knowledge on control systems and components.
- Connect and analyze motors.
- Connect transformers.
- Describe class 1 and class 2 circuits.
- Describe three-phase fundamentals.

Competences:

- Troubleshoot electrical system faults.
- Demonstrate knowledge of control systems and components.
- Demonstrate knowledge of variable frequency drives.
- Install and maintain electromechanical control systems.
- Maintain electrical components of HVAC/R equipment.
- Install and maintain automation and electronic control systems.
- Service economizer controls and accessories.

Core Competence 5: Heating and Fuel Systems

Core Competence Statement:



Demonstrate knowledge, understanding and proficiency in fuel gas properties, regulations, storage, distribution, components and systems.

Competences:

- Describe distribution and storage of fuel gas.
- Apply knowledge of the properties of gas.
- Apply principles of combustion.
- Describe pilot and pilot burners.
- Describe flues, draft hoods, and vent connections.
- Install and service pressure regulators.
- Troubleshoot basic heating and cooling control circuit of an HVAC unit.
- Calculate and adjust gas consumption on burners up to 400 MBH.
- Troubleshoot electronic ignition systems.
- Install and service natural and fan assisted draft appliances.
- Perform combustion analysis.
- Troubleshoot gas fired equipment.
- Commission appliances up to 400 MBH.

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