	Unit ID: 594
Domain	**AIR CONDITIONING AND REFRIGERATION**
Title:	**Install and assemble commercial air conditioning and refrigeration systems**
Level: 3	**Credits: 10**

Purpose

This unit standard specifies the competencies required to install and assemble air conditioning and refrigeration systems. It includes inspecting worksite condition, producing sketches and schematics of components and installing commercial air conditioning and refrigeration components. This unit standard is intended for those who work as air conditioning and refrigeration mechanics.

Special Notes

1. Entry information:

   Prerequisite
   - Unit 567 - *Apply health and safety routines in an air conditioning and refrigeration workplace* or demonstrated equivalent knowledge and skills.

2. Assessment evidence may be collected from a real workplace or a simulated real workplace or an appropriate simulated realistic environment in which air conditioning and refrigeration operations are carried out.

3. All inspection, operation and maintenance procedures associated with the use of tools and equipment shall comply with manufacturers' specifications and/or company's guidelines and instructions.

4. Glossary of terms:
   - 'ACR' refers to air conditioning and refrigeration systems.
   - 'specifications' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements
   - 'workplace procedures' refers to documents that include worksite rules, code and practice; equipment operating instructions; production specifications; documented quality management systems.

5. Regulations and legislation relevant to this unit standard include the following:
   - Labour Act, No. 11, 2007
   - Occupational Health and Safety Regulations No. 18, 1997

   and all subsequent amendments.

6. Performance of all elements in this unit standard must comply with industry standards.

7. This unit standard applies to single-phase and three-phase air conditioning and refrigeration systems.

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website www.nta.com.na.

Elements and Performance Criteria

Element 1: Plan and prepare for work.

Range

Air conditioning and refrigeration service hand tools may include but are not limited to tools for turning swage and fare tools, tools for gripping and holding, tools for hammering and driving tools for cutting and forming, tools for pulling and pushing, special service tools such as grease gun and silicone gun ,measuring tools, bending tools and measuring instruments.

Air conditioning and refrigeration service power tools may include but are not limited to air blow gun, drill machine, arc welding machine, and grinder.

Equipment may include but are not limited to oxy-acetylene gas welding set, charging station or manifold gauges, recovery machine and vacuum pump.

Performance Criteria

1.1 Work instructions, including job cards, specifications and operational details are obtained, confirmed and applied.

1.2 Workplace inspection, equipment defect identification, assessment of conditions and hazards and determination of work requirements is carried out.

1.3 Safety requirements are followed in line with safety plans and policies.

1.4 Tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults rectified or reported prior to commencement.

1.5 Material requirements are identified and obtained in line with job card and/or specifications.

1.6 Materials are safely handled and located ready for use in line with workplace procedures.

1.7 Technical and/or calibration requirements for tools and equipment are sourced and implemented in line with workplace procedures.

1.8 Pipe work installation is appropriately sequenced in line with job schedule.

1.9 Pipe work routes are planned within the constraints of the building structures (heritage), significant, specifications and regulations.

Element 2: Inspect worksite condition.

Range

Ancillary connections may include but are not limited to water, electricity and plumbing.

Performance Criteria

2.1 Worksite is visually inspected in line with manufacturer's and workplace procedures.

2.2 Installation drawings, schedule of materials and instructions are checked against site conditions and confirmed to suit site conditions in line with workplace procedures.

2.3 Ancillary service connections are identified and verified in line with workplace procedures.

2.4 Integrity of building penetrations is confirmed by appropriate visual and tactile checks in line with workplace procedures.

Element 3: Produce sketches and schematics of components.

Performance Criteria

3.1 Procedures and information required for producing sketches and schematics of components are identified and sourced in line with workplace procedures.

3.2 Schematics are produced to show major and minor system components and interconnecting tube-work in line with workplace procedures.

3.3 Sketches are interpreted; parts and materials needed to assemble components are identified, selected and verified in line with manufactures specifications and workplace procedures.

Element 4: Install commercial ACR components.

Range

ACR system components may include but are not limited to major components such as compressors, condenser, evaporator and metering devices and minor components such as elbows, access fittings, filter driers, sight glasses, anti-vibration devices, line heat exchangers, receivers, and pressure regulating valves and check valves, shut valve, pressure relief valve, oil temperature valve, hand expansion valve, float drain regulators and defrost controls.

Assembly methods may include but are not limited to welding process, adhesives, rivets, fasteners and mounting.

Performance Criteria

4.1 Procedures and information required for installing commercial air conditioning and refrigeration components are identified and sourced in line with drawings, designs, specifications and instructions.

4.2 Materials are cut, drilled, shaped, bent, and/or folded as required by sketches and in line with workplace procedures.

4.3 Electrical and mechanical parts or components are assembled, as required by sketches and instruction in line with manufactures requirements and workplace procedures.

4.4 Refrigerant piping and/or tubing, condensate drain, and ducting are run in line with industry standards.

4.5 Assembly methods are applied in line with workplace procedures.

4.6 Final check of the installed work is made to verify that it complies with all requirements and/or manufactures specifications.

Element 5: Complete work and clean up.

Range

Work completion details may include but are not limited to job card, sign-out form for equipment, and maintenance form.

Performance Criteria

5.1 Work is completed and appropriate personnel notified in line with workplace procedures.

5.2 Work area is cleared of waste, cleaned, restored and secured in line with workplace procedures.

5.3 Reusable material is collected and stored in line with workplace procedures.

5.4 Equipment used is cleaned, checked, maintained and stored in line with workplace procedures.

5.5 Work completion details are finalised in line with workplace procedures.

Registration Data

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