

**Unit ID: 582**

**Domain**

**AIR CONDITIONING AND  
REFRIGERATION**

**Title:**

**Maintain air conditioning and  
refrigeration systems**

**Level: 3**

**Credits: 10**

**Purpose**

This unit standard specifies the competencies required to maintain air conditioning and refrigeration systems. It includes inspecting, maintaining lubrication systems, refrigerant systems, heat transfer mediums and air distribution, mechanical components and conditions and calibrating and testing controls in air conditioning system. 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:

- 'specifications' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements
- 'ACR system' refers to air conditioning and refrigeration 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](http://www.nta.com.na).

## **Elements and Performance Criteria**

### **Element 1: Plan and prepare for work.**

#### **Range**

Tools and equipment may include but are not limited to standard tool box, manifold gauges, pliers, oxy-acetylene gas welding, vacuum pump, refrigerants, screw drivers, leak detecting equipment and multimeter.

#### **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 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 Environmental protection requirements are identified and applied in line with environmental plans and regulatory obligations.

## **Element 2: Inspect ACR system operation.**

### **Range**

Tools and equipments may include but is not limited to service hand tools.

Inspection methods are to include but are not limited to visual, hearing and functional assessment in line with manufacturer's specifications.

Systems components may include but are not limited to evaporator and condenser fans, compressor cycle, drain trays, and drains.

Maintenance activities may include but are not limited to disassemble, cleaning, disinfection and reassemble of components.

### **Performance Criteria**

- 2.1 System components are visually inspected in line with manufacturer's and workplace procedures.
- 2.2 Visual inspections are carried out in line with workplace procedures.
- 2.3 Operational tests of components are conducted.
- 2.4 Fault(s) are identified and reported to appropriate personnel in line with workplace procedures.

## **Element 3: Maintain the integrity of lubrication systems.**

### **Range**

Operational tests may include but are not limited to mechanical tests.

Tools may include but are not limited to grease gun and servicing tools.

### **Performance Criteria**

- 3.1 Procedures and information required for maintaining integrity of lubrication systems are identified and sourced in line with workplace procedures.
- 3.2 Correct sequence of system operation is determined from wiring diagrams and piping schematic in line with workplace procedures.
- 3.3 Lubrication systems variables and components are checked and adjusted in line with manufactures specifications and workplace procedures.
- 3.4 Oil levels and circulation balances are checked and adjusted to meet operational specifications.
- 3.5 Oil leaks are detected and rectified to ensure operational integrity.

- 3.6 Oil properties and conditions are tested and adjusted to meet operational specifications.

**Element 4: Maintain the integrity of refrigerant systems.**

**Range**

Tools and equipment may include but is not limited to leak detecting equipment, service hand tools and manifold gauges.

**Performance Criteria**

- 4.1 Procedures and information required for maintaining refrigerant system are identified and sourced in line with workplace procedures.
- 4.2 Pressure drops across strainers and filter driers are checked and recorded in line with workplace procedures.
- 4.3 Refrigerant leaks are detected and rectified to ensure operational integrity.
- 4.4 System contaminants are detected and removed to ensure operational integrity.
- 4.5 Where connected, safety relief valves are checked and maintained in line with operational specifications.

**Element 5: Maintain the integrity of secondary heat transfer mediums and air distribution systems.**

**Range**

Heat exchangers may include but are not limited to evaporative condensers, air cooled and finned heat exchanger.

**Performance Criteria**

- 5.1 Procedures and information required for maintaining secondary heat transfer mediums and air distribution systems are identified and sourced in line with workplace procedures.
- 5.2 Evaporator or indoor air distribution systems components and airflows are checked and maintained in line with workplace procedures.
- 5.3 Condenser or outdoor air distribution systems are checked and maintained in line with workplace procedures.
- 5.4 Condensate pans and drains are checked, serviced and sanitised to meet operational specifications.
- 5.5 Coil faces, fixings, connections and any ducting are checked, cleaned, sanitised and de-iced to meet operational specifications.

## **Element 6: Maintain the integrity of mechanical components and conditions.**

### **Range**

Maintenance may include but are not limited to mechanical components, thermal insulation, heat transfer component, and defrosting the evaporator (water, electrical and hot gas defrosting methods) and condensate drainage.

Insulation may include but are not limited to armour flux, ducting, pressure vessel and cold room panels.

Components may include but are not limited to duct-attached, fans, pumps and compressors.

### **Performance Criteria**

- 6.1 Insulation and barrier is checked and maintained to meet operational requirements and in line with workplace procedures.
- 6.2 Cold room doors, door hinges, door release mechanisms, bi-flow relief ports and/or curtains are checked and maintained to meet operational requirements and in line with workplace procedures.
- 6.3 Heat exchanger within the system is checked and maintained in line with workplace procedures.
- 6.4 Evaporators are checked and freed from frostiness.

## **Element 7: Complete work and clean up.**

### **Range**

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

### **Performance Criteria**

- 7.1 Work is completed and appropriate personnel notified in line with workplace procedures.
- 7.2 Work area is cleared of waste, cleaned, restored and secured in line with workplace procedures.
- 7.3 Reusable material is collected and stored in line with workplace procedures.
- 7.4 Equipment used is cleaned, checked, maintained and stored in line with workplace procedures.
- 7.5 Work completion details are finalised in line with workplace procedures.

## **Registration Data**

<b>Subfield:</b>	Mechanical Engineering
<b>Date first registered:</b>	27 May 2010
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