



NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR AUTOMOBILE AIR CONDITIONING MECHANIC

**Department of Occupational Standards
Ministry of Labour and Human Resources
Thimphu, Bhutan.**



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FOREWORD

The Department of Occupational Standards of the Ministry of Labour and Human Resources proudly presents National Occupational Skills Standards (OSSs) for Automobile Air Conditioning Mechanic as part of TVET reform initiative for improving the quality of Vocational Education and Training System in Bhutan. The standards represent the fruits of hard work and invaluable experiences gained by the department since its establishment in the latter half of 2003. The main aim of developing Occupational Skills Standards is to set up a well defined nationally recognized Vocational Qualification and Certification system that will help set a benchmark for the Technical Vocational Education and Training (VET) System in our country aligned to international best practices.

Occupational Skills Standards is one of the base pillars in the Bhutan Vocational Qualification Framework (BVQF) and is the first step in its implementation. The standards are developed to ensure that employees or vocational graduates possess and acquire the desired skills, knowledge and attitude required by industries and employers. In order to ensure this close match in supply and demand of skills, knowledge and attitude, standards have been developed in close consultation and partnership with industry experts and validated by the Technical Advisory Committees for the concerned economic sectors.

A vocational education and training system based on Occupational Skills Standards shall ensure that delivered training is of a high quality and relevant to the needs of the labour market. As a result, future TVET graduates will be better equipped to meet the need and expectations of industries and employers. This positive impact on the employability of TVET graduates will enhance the reputation of vocational education and training and make it attractive to school leavers.

While acknowledging the existing level of cooperation and collaboration, the ministry earnestly requests employers and training providers to extend the fullest support and cooperation in implementing the Occupational Skills Standards. The ultimate objective is to build a competent and productive national workforce that will contribute to the continued socio-economic progress of our country.

I gratefully acknowledge the valuable contributions made by experts from industries during the consultation, verification and validation processes of the standards. I look forward to improved engagement and active participation of the industry and employers in the development of a quality assured demand driven TVET system in the near future.

Dorji Wangdi

Minister

Ministry of Labour and Human Resources

INTRODUCTION

A. Occupational Skills Standards (OSS)

Occupational Skill Standards specify the skill, knowledge and attitudes applied to a particular occupation. Standards also specify the standards or criteria of performance of a competent worker and the various contexts in which work may take place. Standards provide explicit advice to assessors regarding the skill and knowledge to be demonstrated by candidates seeking formal recognition either following training or through work experience.

Purpose of Occupational Skills Standards

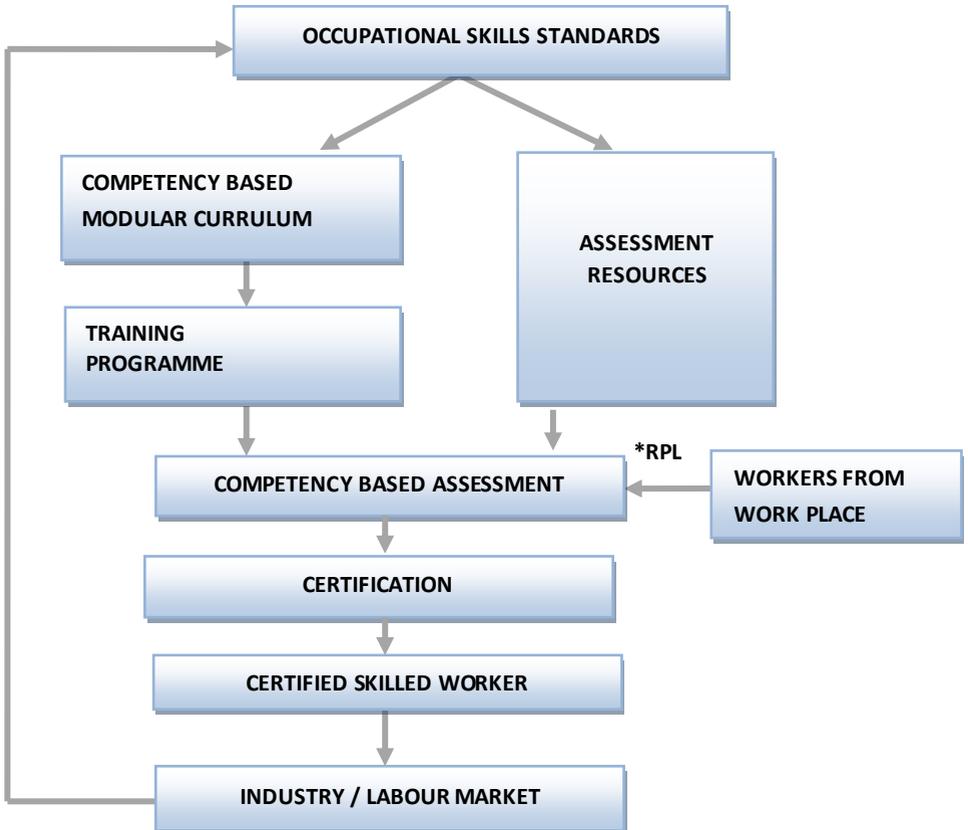
Skill Standards serve a number of purposes including:

- Providing advice to curriculum developers about the skill and knowledge to be included in curriculum.
- Providing specifications to assessment resource developers about the skill, knowledge and attitudes within an occupation to be demonstrated by candidates.
- Providing advice to industry/employers about job functions, which in turn can be used for the development of job descriptions, performance appraisal systems and work flow analysis.

B. Bhutan Vocational Qualification Framework (BVQF)

Bhutan Vocational Qualifications Framework is an agreed system of Assessing, Certifying and Monitoring nationally recognized qualifications for all learning in the TVET sector against national standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

Components of the Bhutan Vocational Qualification Framework (BVQF)



* RPL = Recognition of Prior Learning

BVQF Levels

The Bhutan Vocational Qualification Framework has three levels classified based on the competency of the skilled workers. The three levels are:

- National Certificate Level 3 (NC III)
- National Certificate Level 2 (NC II)
- National Certificate Level 1 (NC I)

BVQF Level Descriptors

The qualification levels are decided based on level descriptors. The detail of the qualification level descriptor is as follows:

National Certificate Level 1

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none">• Are narrow in range.• Are established and familiar.• Offer a clear choice of routine responses.• Involve some prioritizing of tasks from known solutions.	<ul style="list-style-type: none">• Basic operational knowledge and skill.• Utilization of basic available information.• Known solutions to familiar problems.• Little generation of new ideas.	<ul style="list-style-type: none">• In directed activity.• Under general supervision and quality control.• With some responsibility for quantity and quality.• With no responsibility for guiding others.

National Certificate Level 2

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> • Require a range of well developed skills. • Offer a significant choice of procedures requiring prioritization. • Are employed within a range of familiar context. 	<ul style="list-style-type: none"> • Some relevant theoretical knowledge. • Interpretation of available information. • Discretion and judgments. • A range of known responses to familiar problems 	<ul style="list-style-type: none"> • In directed activity with some autonomy. • Under general supervision and quality checking. • With significant responsibility for the quantity and quality of output. • With some possible responsibility for the output of others.

National Certificate Level 3

Carry out processes that:	Learning demand:	Responsibilities which are applied:
<ul style="list-style-type: none"> • Requires a wide range of technical or scholastic skills. • Offer a considerable choice of procedures requiring prioritization to achieve optimum outcomes. • Are employed in a variety of familiar and unfamiliar contexts. 	<ul style="list-style-type: none"> • A broad knowledge base which incorporates some theoretical concepts. • Analytical interpretation of information. • Informed judgment. • A range of sometimes innovative responses to concrete but often unfamiliar problems. 	<ul style="list-style-type: none"> • In self-directed activity. • Under broad guidance and evaluation. • With complete responsibility for quantity and quality of output. • With possible responsibility for the output of others.

PURPOSE

This suite of qualification is designed for people interested in a career as Automobile Air Conditioning Mechanic.

In order to have a successful qualification as an Automobile Air Conditioning Mechanic in National Certificate Level 3, successful completion of qualification in National Certificate Level 2 for Auto Mechanic is a prerequisite for entry into these qualifications.

The qualification comprises five industries – specific Occupational Skills Standards that cover the essential knowledge and skills required of Automobile Air Conditioning Mechanic including carrying out of preliminary inspection of the automobile air conditioners for installation / modification / repair / or servicing, preparation of estimates and costing, performing refrigerant recovery and re-cycling, Service of automobile air conditioning systems and re-installation of automobile air conditioning systems.

The National Certificate in Automobile Air Conditioning Mechanic Level 3 is currently the final achievement in this qualification pathway.

A diagram of the qualification pathway provided by these three National Certificates follows.

PACKAGING OF QUALIFICATION FOR AUTOMOBILE AIR CONDITIONING MECHANIC

National Certificate Level 3



MODULE 5

1. Re-install automobile air conditioning system (7127-M5-01-L3)

MODULE 4

1. Service automobile air conditioning systems (7127-M4-01-L3)

MODULE 3

1. Perform refrigerant recovery and re-cycling (7127-M3-01-L3)

MODULE 2

1. Prepare estimates and costing (7127-M2-01-L3)

MODULE 1

1. Carry out preliminary inspection of the automobile air conditioners for installation and repair work (7127-M1-01-L3)

Pre-requisite: Automobile Electrician (NC-II) course



CODING USED FOR OCCUPATIONAL SKILLS STANDARDS

The coding and classification system developed in Bhutan is logical, easy to use, and also aligned with international best practises. The Bhutanese coding and classification system is based on the International Standard Classification of Occupations, 2008 (ISCO-08) developed by the International Labour Organisation (ILO).

The coding of the occupational skills standards forms the basis of the identification code for the Vocational Education and Training Management Information System (VET – MIS) both in terms of economic sector identification and that of the individual standard.

Coding the individual occupational skills standards

Coding the individual skills standard has a multiple purpose:

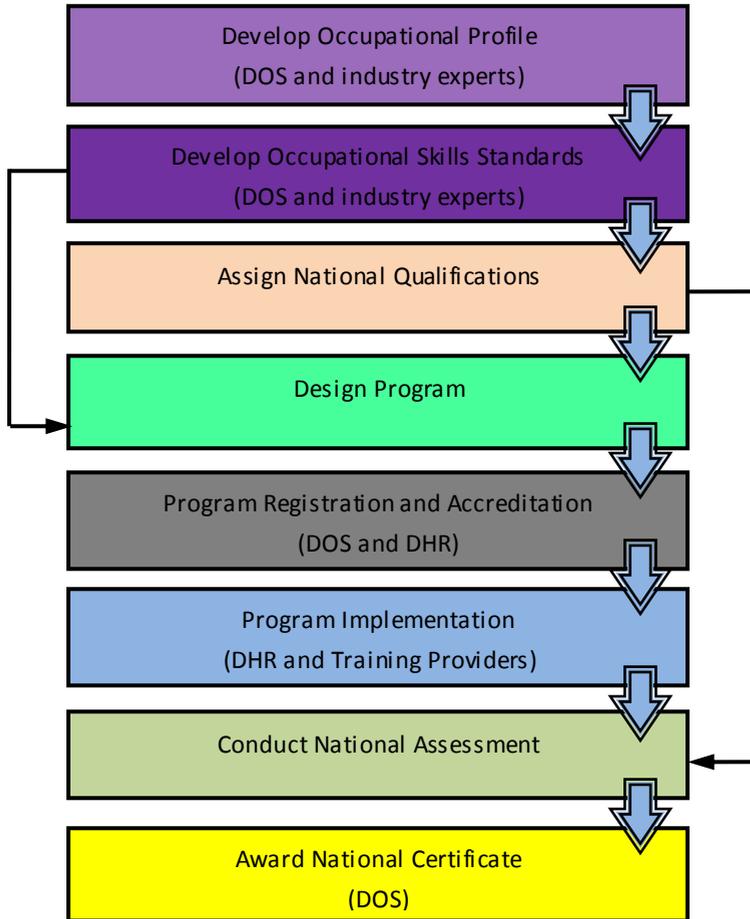
- to identify the level,
- to identify to which module the standard belongs,
- to identify in which order the standard is clustered within that module.

A job can include a number of competencies described in the Occupational Skills Standards.

However, in order to follow a logical order, only Occupational Skills Standards related to each other and following a logical sequence in terms of training delivery, from the simple to the complex, are clustered into a module. Some standards are so complex that they need to stand alone.

To illustrate with an example (7127-M1-01-L1), the ILO assigns the code 7127 to the occupation of Air Conditioning and Refrigeration mechanics. Therefore, in the Bhutan context, the occupation Automobile Air Conditioning mechanics has been assigned the code 7127 in the National Coding System. The first module is assigned the code M1, the first Occupational Skills Standard clustered into the first module (M1) is designated the code 7127 M1 01. Levels are assigned the code L and follow a logical progression from the National Certificate Level 1 (NC I) to the National Certificate Level 3 (NC III). Therefore the National Certificate Level 3 is assigned the code L3.

Implementation and operational procedures for Occupational Skills Standard (OSS)



Key:

MoLHR – Ministry of Labour and Human Resources

DHR – Department of Human Resources

DOS – Department of Occupational Standards

NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR PANEL BEATER

Validation date : 19th November 2010.

Endorsement date : 8th December, 2010.

Date of Review : 8th December, 2013 (max. 3 years).

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4. Sonam Tobgay, Road Safety & Transport Authority, Thimphu.
5. Tshering Dorji, Tee Dee Workshop, Thimphu.
6. Sangay Wangchuk, Samthang Institute of Automobile Engineering, Wangdue.
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Perform refrigerant recovery and re-cycling	<ol style="list-style-type: none">1. Prepare for work2. Couple the recovery unit to the equipment for recovery of refrigerant.3. Recover refrigerant4. Recycle refrigerant	22
Service automobile air conditioning systems	<ol style="list-style-type: none">1. Prepare for work2. Check and identify defects3. Repair / or service refrigerant system of the Automobile Air Conditioner4. Repair electrical / electronic system of the Automobile Air Conditioner	26

Re-install automobile air conditioning systems	<ol style="list-style-type: none">1. Prepare for re-installation work2. Re-Install automobile air conditioners3. Charge refrigerant4. Test the performance of the Air Conditioning system	31
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**AUTOMOBILE AIR CONDITIONING MECHANIC
NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR
NATIONAL CERTIFICATE LEVEL 3 (NC 3)**

OSS TITLE	ELEMENTS OF COMPETENCE	PAGE
Carry out preliminary inspection of the automobile air conditioner for installation / repair work	<ol style="list-style-type: none"> 1. Prepare for work 2. Check automobile Air Condition (AC) 	16
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Re-install automobile air conditioning systems	<ol style="list-style-type: none"> 1. Prepare for re-installation work 2. Re-Install automobile air conditioners 3. Charge refrigerant 4. Test the performance of the Air Conditioning system 	31

OSS TITLE : Carry out preliminary inspection of the automobile air conditioner for installation and repair work

DESCRIPTOR : This OSS covers the competencies required to operate and check automobile air conditioner, initiate a job card and accept it for installation / modification / repairs / servicing and handing over on completion of job to industry standards following safe work practices at all times in the use of materials and equipment.

CODE : 7127-M1-01-L3

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare for work	1.1 Select appropriate PPE according to job requirements. 1.2 Select Tools and equipment as per the job requirements and check to ensure safe and proper working condition. 1.3 Gather information from customer regarding the installation / modification / repair / servicing needed.
2. Check Automobile Air Condition (AC)	2.1 Inspect visually for any damage / defects / leakage and note down in accordance with establishment procedures. 2.2 Check the gas in the AC system in accordance with standard procedures 2.3 Check electrical wiring system in accordance with standard procedures 2.4 Check gas leakages in the AC components system cycles in accordance with standard procedures 2.5 Check gas clogged in the system in accordance with standard procedures 2.6 Check compressor lubrication / oil in accordance with standard procedures 2.7 Check compressor belts for tension, wear and tear in accordance with standard procedures

	2.8	Check condenser for damage and leakage in accordance with standard procedures
	2.9	Check condenser fan for damage and proper functioning in accordance with standard procedures
	2.10	Initiate job card and take over vehicle for service in accordance with establishment procedures

RANGE STATEMENT

PPE may include but not limited to:

- Gloves
- Safety boot
- Goggles
- Mask

Tools and equipments may include but not limited to:

- Spanner set
- Screw driver
- Extension cord
- Refrigerant
- Flaring tool set
- Multi meter
- Weighing scale
- Valve key
- Adopter set (push type)
- Vacuum pump / compressor
- Leak detector
- Pliers

Electrical wiring system may include but not limited to:

- Fuse
- Thermister
- Thermostat / selection switch
- HP/LP hose / pipes
- Relays
- Electrical magnetic clutch
- Evaporator temperature sensor
- Fan motor

AC system cycle component may include but not limited to:

- Connecting pipes / joints
- Compressor
- Condensers
- Liquid receiver / Filter drier
- Expansion valve
- Cooling coil / evaporator

ASSESSMENT GUIDE

Form of assessments

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.

Critical aspect

- Demonstrate compliance with safety regulations applicable to work operations at all times especially in gas filling
- Receive the customer with due courtesy and politeness
- Carry out inspection in accordance with manufacturer's specifications

UNDERPINNING KNOWLEDGE

- OHS regulations
- Basic First aid treatments
- Reading & Interpretation of drawings and specifications
- Types of refrigerant in the A/C system
- Common faults in AC systems
- Basic working of AC systems
- Types of insulation materials
- Environment act

UNDERPINNING SKILLS

- Handling of tools and equipments
- Interpretation of work instructions and specifications
- Team work
- Communication skills
- Effective Work Planning
- Good house keeping
- Maintain records and reports
- Adhere to safe work practices

OSS TITLE : Prepare estimate and costing

DESCRIPTOR: This OSS covers the competencies required to prepare fair and competitive estimate and costing to service automobile AC systems in accordance with establishment procedures following safe work practices at all times.

CODE : 7127-M2-01-L3

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare estimate to repair / service an AC system	1.1 Identify defects in AC system by customer's complaints, and by observing starting and running noises, cooling effect. 1.2 Inspect entire AC system and identify and record extent of repairs / or service in accordance with establishment procedures 1.3 Identify and record required components for replacement in accordance with job requirements 1.4 Calculate the cost of materials / components required for repair / service in accordance with establishment procedures 1.5 Work out the cost of labour necessary to carry out repairs / service in accordance with establishment procedures 1.6 Prepare total estimate including a profit margin for repairs / servicing in accordance with establishment procedures 1.7 Share the estimate with customer for approval in accordance with establishment procedures
2. Prepare estimates for the upgrading of automobile AC	3.1 Check availability of required power on the vehicle to meet the power demand due to up gradation in accordance with manufacturer specifications 3.2 Identify and estimate the material required for up gradation of automobile AC

	<p>3.3 List and estimate components required for up gradation of automobile AC</p> <p>3.4 Prepare total estimate including labour cost, profit margin and taxes and share with customer for approval in accordance with establishment procedures.</p>
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ASSESSMENT GUIDE

Form of assessments

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.

Critical aspect

- Current market prices of automobile AC, materials / components
- Preparation of estimate in accordance with establishment procedures.

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none">• Basic applied mathematics• Reading and writing• Current market price• Estimation and costing	<ul style="list-style-type: none">• Interpretation of work instructions and specifications• Team work• Communication skills• Effective Work Planning• Basic Applied mathematic

OSS TITLE : Perform refrigerant recovery and re-cycling

DESCRIPTOR: This unit is covers competencies required to perform refrigerant recovery and re-cycling, using specified refrigerant recovery plant, complying with environmental standards, ensuring safe working in all operations and also in the use of relevant materials at all times.

CODE : 7127-M3-01-L3

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare for the work	<p>1.1 Appropriate PPE are selected and used according to job requirements.</p> <p>1.2 Tools and equipments are selected as per the job requirements and are checked to ensure that they are in safe and proper working condition.</p> <p>1.3 Information regarding the non functioning of tools and equipments are communicated to appropriate personnel effectively and immediately as per the site / company procedures</p> <p>1.4 Materials are selected and obtained as per the job requirements.</p> <p>1.5 Work area are assessed for hazards associated with arc welding process and all necessary precaution taken in accordance with safe working practice.</p>
2. Couple the recovery unit to the equipment for recovery of refrigerant.	<p>2.1 Identify the type of refrigerant to be recovered in accordance with available information.</p> <p>2.2 Select appropriate method for connecting charging hoses for recovering refrigerant from the system, either with service / charging valve.</p> <p>2.3 Transfer the refrigerant in the unit to a separate cylinder after ensuring that the recovery unit to be free from other type of refrigerant and ensuring that no refrigerant escapes to the atmosphere.</p>

	<p>2.4 Connect gauge manifold to the system correctly in accordance with the standard colour codes of hoses of manifold gauge.</p> <p>2.5 Couple recovery unit to the equipment in accordance with the standard procedure for connections.</p> <p>2.6 Connect overall protection device to ensure safety of the operation in accordance with standard practices.</p>
3. Recover refrigerant	<p>3.1 Start recovery unit and monitor the process and ensure full recovery of refrigerant in accordance with standard procedures.</p> <p>3.2 Disconnect the system after completion of recovery in accordance with standard procedure ensuring no escaping of refrigerant into the atmosphere.</p> <p>3.3 Safe working practices are followed throughout the task according to OHS regulations.</p>
4. Recycle refrigerant	<p>4.1 Recover the refrigerant and record the weight of cylinder in accordance with standard procedures.</p> <p>4.2 Couple the recovered refrigerant cylinder to the empty cylinder and to the recycling machine observing standard procedure and safety practices.</p> <p>4.3 Start recycling machine and monitor the process to ensure proper operation in accordance with manufacturers specifications</p> <p>4.4 Re-cycle all refrigerant, disconnect hoses and re weight the cylinder to determine the weight of refrigerant recovered in accordance with standard procedures.</p> <p>4.5 Ensure recycling of all refrigerant following safety practices during the process.</p>

RANGE STATEMENT

PPE may include but not limited to:

- Gloves
- Safety boot
- Goggles
- Mask

Tools and Equipments may include but not limited to:

- Refrigerant recovery machine
- Weighing scale
- Gauge manifold with hoses
- Refrigerant recycling machine

Materials may include but not limited to:

- Empty refrigerant cylinders
- Valve keys

Hazards may include but not limited to:

- Fire
- Leakage
- Frost bite

ASSESSMENT GUIDE

Form of assessments

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.

Critical aspect

- Demonstrate compliance with safety regulations applicable to work operations at all times.
- Ensure full recovery and re-cycling of the refrigerant, avoiding mix up

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • OHS regulations • Basic First aid treatments • Materials, tools and equipments • Interpretation of drawings and specifications • Basic refrigeration and air conditioning principles • Refrigeration cycle • Types of refrigerants and its properties • Function and operation of the recycling and recovery machine • Ozone depleting substances (ODS) • Function of the manifold gauge and the color code of hoses • Types and operation of fire extinguishers. • Environment act 	<ul style="list-style-type: none"> • Interpret plans and details • Demonstrate safe work practices • Handling of tools, equipments and materials • Basic applied mathematics • Measurement • Team work

OSS TITLE : Service Automobile Air Conditioning system

DESCRIPTOR: This OSS covers the competencies required to service automobile Air conditioning system using specified tools, equipment and materials in accordance with standard procedures while ensuring safe working in such operations and also in the use of tools and equipments.

CODE : 7127-M4-01-L3

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare for work	<p>1.1 Prepare job card in accordance with establishment procedures</p> <p>1.2 Appropriate PPE are selected and used according to job requirements.</p> <p>1.3 Tools and equipments are selected as per the job requirements and are checked to ensure that they are in safe and proper working condition.</p> <p>1.4 Information regarding the non functioning of tools and equipments are communicated to appropriate personnel effectively and immediately as per the site / company procedures</p> <p>1.5 Select materials are selected and obtained as per the job requirements.</p> <p>1.6 Work area is assessed for hazards associated with refrigerant gases and all necessary precaution taken in accordance with safe working practice.</p>
2. Check and identify defects	<p>2.1 Switch on AC and check the extent of repair / or servicing in accordance with standard procedures</p> <p>2.2 Identify and locate the defects using specified test instrument as per manufacturer's instruction following standard procedures</p> <p>2.3 Identify appropriate correcting measures in accordance with standard procedures.</p>

<p>3. Repair / or service refrigerant system of the Automobile Air Conditioner</p>	<p>3.1 Recover the refrigerant in the system where necessary using specified recovery equipment following safety procedures.</p> <p>3.2 Check the condition of compressor and replace, if necessary in accordance with job requirements following standard procedures</p> <p>3.3 Check for defect and defective parts and replace where necessary in accordance with specifications and manufacturers instructions</p> <p>3.4 Test pressure for leaks / clogs and replace where necessary in accordance with specifications and manufacturers instructions</p> <p>3.5 Check expansion valve for proper operation and replace where necessary in accordance with manufacturers specifications</p> <p>3.6 Check condenser visually and service / or replace where necessary using specified test equipment</p> <p>3.7 Check cooling / blower and replace where necessary in accordance with manufacturers instructions</p> <p>3.8 Inspect filter / receiver driers and replace where necessary in accordance with manufacturer specifications</p> <p>3.9 Test refrigerant liquid lines and hoses pressure using specified test equipment and replace if necessary in accordance with manufacturers specifications</p> <p>3.10 Check sight glass, gas accumulator and replace if necessary in accordance with manufacturers' specifications</p> <p>3.11 Evacuate system using dry nitrogen and vacuum pump and test in accordance with manufacturers specifications</p> <p>3.12 Charge system gas with specified refrigerant using gas – charging equipment in accordance with manufacturers specifications.</p> <p>3.13 Check the condition of compressor / idler pulley and tighten belts correctly if necessary in accordance with manufacturers specifications</p>
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<p>4. Repair electrical / electronic system of the Automobile Air Conditioner</p>	<p>4.1 Check internal and external electrical / electronic systems for operation and repair / or replace where necessary in accordance to manufacturers specifications and instructions</p> <p>4.2 Check the performance of Air conditioner in accordance with manufacturers' specifications</p> <p>4.3 Check controls and replace / or repair where necessary in accordance with manufacturers' specifications</p> <p>4.4 Check electronic climatic controls for satisfactory operation and replace where necessary in accordance with manufacturers instructions</p> <p>4.5 Check selection switch using specified test instruments to correct functioning and replace if necessary in accordance with manufacturers specifications</p> <p>4.6 Check ventilation system including dust filters for correct functioning and service / or replace where necessary in accordance with manufacturers specifications</p> <p>4.7 Check air conditioning system and make final adjustment and ensure it's specified performance in accordance with standard practices and manufacturers specifications</p>
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RANGE STATEMENT

PPE may include but not limited to:

- Goggles
- Safety boot
- Gloves
- Mask

Tools and equipments may include but not limited to:

- Spanner set & flaring tool set
- Screw driver & multi meter
- Extension cord
- Refrigerant
- Valve key & pliers
- Adopter set (push type)
- Vacuum pump / compressor
- Leak detector

Materials may include but not limited to:

- Refrigerant
- Lubricants
- Valves
- O-ring

Hazards may include but not limited to:

- Fire
- Leakage
- Frost bite

ASSESSMENT GUIDE

Form of assessments

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.

Critical aspect

- Demonstrate compliance with safety regulations applicable to work operations at all times.
- Using of tools and equipments correctly in accordance with manufacturers' specifications
- Make correct mechanical adjustment to belts and pulleys and ensuring correct pressures at various points in the system.
- Perform work to specifications

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • OHS regulations • Basic First aid treatments • Reading & Interpretation of drawings / manuals and specifications • Types of refrigerant tubing used in air conditioning • Automobile electrical / electronic systems and their application to automobile air conditioning systems • Power transmission with pulleys and belts • Climatic control • Refrigerant recovery process • Types of refrigerant and its properties • Pressure testing methods • Common faults in automobile air conditioning systems • Types of fire extinguishers and their applications • Tools and equipment • Environment act 	<ul style="list-style-type: none"> • Handling of tools and equipments • Interpretation of work instructions, manuals and specifications • Team work • Communication skills • Effective Work Planning • Basic Applied mathematic • Safe use of fire extinguisher • Economic use of accessories

OSS TITLE : Re-install Automobile Air Conditioning system

DESCRIPTOR: This OSS covers the competencies required to re-install automobile air conditioning system using specified tools, equipments and materials in accordance with manufacturers' specifications ensuring safe working practices in such operation.

CODE : 7127-M5-01-L3

ELEMENTS OF COMPETENCE	PERFORMANCE CRITERIA
1. Prepare for re-installation work	1.1 Prepare job card in accordance with establishment procedures 1.2 Appropriate PPE are selected and used according to job requirements. 1.3 Tools and equipments are selected as per the job requirements and are checked to ensure that they are in safe and proper working condition. 1.4 Information regarding the non functioning of tools and equipments are communicated to appropriate personnel effectively and immediately as per the site / company procedures 1.5 Materials are selected and obtained as per the job requirements. 1.6 Work area are assessed for hazards associated with arc welding process and all necessary precaution taken in accordance with safe working practice.
2. Re-Install automobile air conditioners	2.1 Re-Install A/C system in accordance with manufacturer's specifications following standard work practices 2.2 Follow safety procedures in accordance with safe working procedures.
3. Charge refrigerant	3.1 Identify and select refrigerant referring to the manufacturer's specifications 3.2 Flush refrigerant circuit with specified flushing

	<p>agents in accordance with manufacturer's specifications</p> <p>3.3 Check refrigerant circuit pressure with dry nitrogen using specified testing equipments.</p> <p>3.4 Test leaks and repair using specified equipment in accordance with manufacturer's specifications</p> <p>3.5 Evacuate system using vacuum pump and test thereafter in accordance with manufactures instructions</p> <p>3.6 Charge gas according to manufacturer's specifications using specified gas charging equipments</p> <p>3.7 Test and record pressure as outlined by manufacturer.</p> <p>3.8 Complete tasks without causing damage to tools, equipments and materials</p>
<p>4. Test the performance of the Air Conditioning system</p>	<p>4.1 Test and record (satisfactory) temperatures at specified locations in accordance with manufacturers' specifications</p> <p>4.2 Check pressure (suction and discharge) in accordance with manufacturer's specifications</p> <p>4.3 Check air flow and cooling effect in accordance with manufacturers' specifications</p> <p>4.4 Check engine for excessive heating and note down observation in accordance with manufacturers' specifications</p> <p>4.5 Check charging level of battery and ensure satisfactory charging of battery in accordance with manufacturers' specifications</p> <p>4.6 Check overall performance of the system and ensure satisfactory performance in accordance with manufacturers' specifications</p>

RANGE STATEMENT

PPE may include but not limited to:

- Goggles
- Safety boot
- Gloves
- Mask

Tools and equipments may include but not limited to:

- Spanner set
- Screw driver
- Extension cord
- Refrigerant
- Flaring tool set
- Multi meter
- Valve key
- Adopter set (push type)
- Vacuum pump / compressor
- Leak detector
- Pliers
- Weighing scale

Materials may include but not limited to:

- Refrigerant
- Lubricants
- Valves
- O-ring

Hazards may include but not limited to:

- Fire
- Leakage
- Frost bite

ASSESSMENT GUIDE

Form of assessments

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be assessed through diagrams, in writing or orally (viva-voce).

Assessment context

- Competency may be assessed in the actual work place or in a simulated workplace setting.

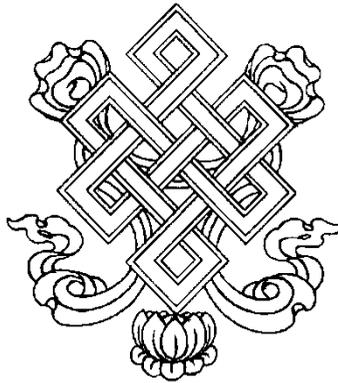
Assessment condition

- The candidate shall have access to all required tools, equipments, materials and documents.
- Candidate must complete the assessment in industry accepted time frame.

Critical aspect

- Demonstrate compliance with safety regulations applicable to work operations at all times.
- Correct use of tools and equipments
- Re-installation of A/C system in accordance with manufacturers' specifications

UNDERPINNING KNOWLEDGE	UNDERPINNING SKILLS
<ul style="list-style-type: none"> • OHS regulations • Tools and equipments • Linear and cubic measurements • Drawings and manuals / manufacturers specifications • Types of pressure gauges • Types of A/C system and their applications • Refrigerant used and their application • Basic Applied mathematic • Economic use of materials • Estimation of materials • Environment act 	<ul style="list-style-type: none"> • Proper handling of tools and equipments • Applications of safety practices • Communications skills • Decision making and problem solving • Team work • Interpretation of drawings and specifications.



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