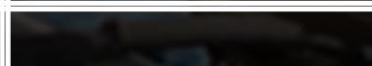
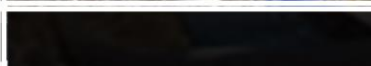
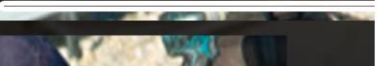
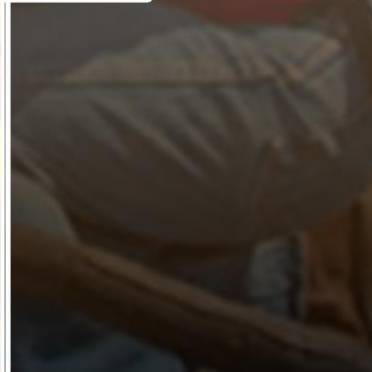
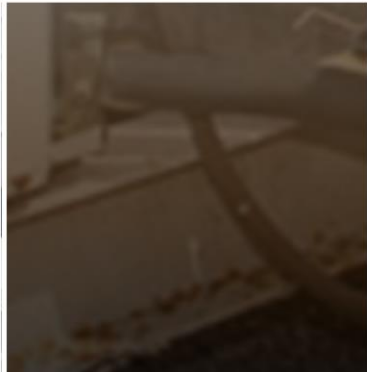
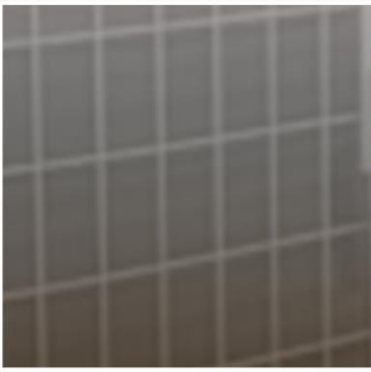


National Vocation Certificate Level 2 in Mechanical Technology (Heat Ventilation & Air Conditioning (HVAC))

Competency Standards



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A. Initiate HVAC work

Overview: This Competency Standard identifies the competencies required to initiate HVAC work. A person will be expected to follow dress code, clean up service vehicle, job site, and perform maintenance of tools, test equipment, delegate work to subordinate, obtain material from store, report safety violation. This unit cover the knowledge regarding safety rule, personal protective equipment, and primary maintenance procedure, code, standards for initialize HVAC work to provide you the basis for your work.

Competency Unit	Performance Criteria	Knowledge and Understanding
A- 1 Follow dress code	<p>Trainee must be able to</p> <ul style="list-style-type: none"> P1. Follow Personal Protective Equipment(PPE) before initiate work P2. Wear protective clothing as described to meet standard dress code P3. Gentle haircut, or covered properly for safely work P4. Cut nail as described 	<p>Trainee need to know and understand</p> <ul style="list-style-type: none"> K1. Define safety rules of personal and work safety. K2. Describe Personal Protective Equipment
A-2 Clean up service vehicle	<p>Trainee must be able to</p> <ul style="list-style-type: none"> P1. Check vehicle fuel to attain job site P2. Check breaking system accordingly P3. Check cooling system of vehicle to maintain vehicle performance P4. Inspect electrical system of vehicle accordingly P5. Check vehicle mechanical system for operation 	<p>Trainee need to know and understand</p> <ul style="list-style-type: none"> K1. Define basic rule and regulation of light transport vehicle driving skills K2. Describe route of traveling to jobsite K3. Define Primary maintenance procedure of HVAC

Competency Unit	Performance Criteria	Knowledge and Understanding
A-3 Clean up Job site	<p><i>Trainee must be able to</i></p> <p>P1. clean slippery material from workplace & surrounding for clean operation</p> <p>P2. Remove extra material from workplace to reduce uncertainty</p> <p>P3. Prepare platform for clean and safe job done</p> <p>P4. Clear workplace after work done to organization</p>	<p><i>Trainee need to know and understand</i></p> <p>K1. Explain safety rules of jobsite cleanness</p> <p>K2. Describe PPE</p> <p>K3. Express work ethics</p>
A-4 Perform maintenance on tools (maintain tools)	<p><i>Trainee must be able to</i></p> <p>P1. Clean tools as described</p> <p>P2. Service the tools if required for proper working condition</p> <p>P3. Place tools properly for safe and correct operation</p> <p>P3. Handle tools accordingly</p>	<p><i>Trainee need to know and understand</i></p> <p>K1. Express identification of tool</p> <p>K2. Distinguish tools as categorized</p> <p>K3. Explain adjustment of tools</p> <p>K4. Describe maintenance procedure of tools</p>
A-5 Perform maintenance on test equipment (maintain test equipment)	<p><i>Trainee must be able to</i></p> <p>P1. Clean test equipment for correct operation accordingly</p> <p>P2. Service the equipment if required for accurate operation</p> <p>P3. Place equipment properly</p>	<p><i>You need to know and understand</i></p> <p>K1. Express identification of equipment</p> <p>K2. Distinguish equipment as categorized</p> <p>K3. Explain calibration of equipment</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
	P4. Handle equipment properly	K4. Explain basic electrical principles K5. Explain basic mechanical principles K6. Explain basic refrigeration principles
A-6 Report safety violations	<i>Trainee must be able to</i> P1. Collect evidence of safety violations P2. Check electrical hazards P3. Check mechanical risks P4. Fill the job card	You need to know and understand K1. Understand electrical hazards K2. Understand mechanical risks K3. Comprise irregularities
A-7 Delegate work to subordinate	<i>Trainee must be able to</i> P1. Sequence the job P2. Split the job P3. Check the work done by subordinates	You need to know and understand K1. Describe the sequence of operation k2. Understand the competency of subordinates K3. Understand the standards

Competency Unit	Performance Criteria	Knowledge and Understanding
A-8 Obtain material from Store	<p><i>Trainee must be able to</i></p> <p>P1. Make list of required materials according to job.</p> <p>P2. Verify the material as per standards</p>	<p>You need to know and understand</p> <p>K1. Identify required material according to job</p> <p>K2. Understand the code and standards</p>

B. Install HVAC Units

Overview: This Competency Standard focuses on the skills required to identify job specification verify field location and measurements, obtain specified equipment deliver material on job site, position HVAC equipment, install duct system(verify duct system), flues/ smoke pipes(verify pipes installation), install control wiring, refrigerant piping. Perform evacuation and dehydration of refrigeration system, install primary wiring, fuel piping, condensate drain piping, mount supply return air(duct) terminals, seal structural penetration, mount control system, and refrigerant charging, in install HVAC units, in accordance with the organization’s approved guidelines and procedures. Your knowledge regarding installation of HVAC units procedures, criteria, requirement of tools, calculation, foundation structure, interpret drawings, codes, refrigerant system, standards, sealing process, control application, and charging system will be sufficient to provide you the basis for installation of HVAC units work.

Competency Unit	Performance Criteria	Knowledge and Understanding
B-1 Identify job specifications	<p><i>Trainee must be able to</i></p> <p>P1. List tools and equipment according to job P2. Prepare toolkit according to job P3. Arrange proper handling of equipment P4. Prepare list of manpower</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand installation criteria K2. Understand the requirement of tools and equipment K3. Describe manpower according to job</p>
B-2 Verify field locations and measurements	<p><i>Trainee must be able to</i></p> <p>P1. Visit the field location P2. Select the proper location Take measurement</p>	<p><i>You need to know and understand</i></p> <p>K1. Analyze the field location K2. Understand shop drawing Calculate the measurement</p>
B-3 Obtain specified equipment	<p><i>Trainee must be able to</i></p> <p>P1. Select required equipment P2. Check the physical condition of equipment</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand the application of equipment K2. Understand the structure of equipment</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
B-4 Deliver material to job site	<p><i>Trainee must be able to</i></p> <p>P1. Transport material accordingly P2. Load/ unload material safely Acknowledge from user accordingly</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand the nature of material K2. Understand procedure of safe handling K3. Understand valid acknowledgement procedure</p>
B-5 Position HVAC equipment	<p><i>Trainee must be able to</i></p> <p>P1. Prepare foundation for equipment P2. Arrange hoisting machines P3. Place HVAC equipment on prescribed location</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand the structure of foundation K2. Understand type of hoisting machines K3. Understand noise and vibration control</p>
B-6 Install duct system(verify installation of duct)	<p><i>Trainee must be able to</i></p> <p>P1. Check duct rout according to drawing P2. Verify duct size according to drawing P3. Check hangers and joints of duct P4. Check duct joints by smoke/ light test Check insulation accordingly</p>	<p><i>You need to know and understand</i></p> <p>K1. Interpret duct drawing K2. Understand material specifications K3. Describe duct testing standards</p>
B-7 Install flues /Smoke pipes (verify installation of flues/ smoke pipes)	<p><i>Trainee must be able to</i></p> <p>P1. Check flues/smoke pipes rout according to drawing P2. Verify flues/smoke pipes size according to drawing P3. Check Support/ hangers and joints of flues/smoke pipes P4. Check flues/smoke pipes height P5. Check insulation accordingly</p>	<p><i>You need to know and understand</i></p> <p>K1. Interpret piping drawing K2. Understand material specifications K3. Describe flues/smoke pipes testing standards</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
B-8 Install control wiring	<p><i>Trainee must be able to</i></p> <p>P1. Check wiring route according to drawing P2. Verify wiring gauge according to drawing P3. Verify wiring circuit accordingly Connect wiring according to drawing</p>	<p><i>You need to know and understand</i></p> <p>K1. Read wiring diagram K2. Understand color code standard K3. Understand basic electrical concepts</p>
B-9 Install refrigerant piping	<p><i>Trainee must be able to</i></p> <p>P1. Check piping route according to drawing P2. Verify piping size according to drawing P3. Install hangers for piping P4. Perform pipe jointing P5. Install piping accordingly P6. Perform pipe leakage test Perform insulation accordingly</p>	<p><i>You need to know and understand</i></p> <p>K1. Interpret HVARC piping drawing K2. Understand material specifications K3. Describe pipe jointing methods K4. Describe leakage testing methods K5. Describe drawbacks of sharp bending</p>
B-10 Perform evacuation and dehydration of refrigeration system	<p><i>Trainee must be able to</i></p> <p>P1. Install gauge manifold P2. Flash with nitrogen P3. Perform evacuation</p>	<p><i>You need to know and understand</i></p> <p>k1. Understand pressure testing equipment k2. Describe refrigeration system flashing methods k3. Understand vacuum standards</p>
B-11 Install primary wiring	<p><i>Trainee must be able to</i></p> <p>P1. Check wiring route according to drawing P2. Verify wiring gauge according to drawing P3. Verify wiring circuit accordingly P4. Connect wiring as described</p>	<p><i>You need to know and understand</i></p> <p>k1. Read wiring diagram k2. Understand color code standard k3. Understand basic electrical concepts</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
B-12 Install fuel piping	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Check fuel pipes rout according to drawing P2. Verify fuel pipes size according to drawing P3. Check Support/ hangers and joints of fuel pipes P4. Perform leakage test 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> k1. Interpret fuel piping drawing k2. Understand material specifications k3. Describe fuel pipes testing methods
B-13 Install condensate drain piping	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Check drain pipes rout according to drawing P2. Verify drain pipes size according to drawing P3. Install Support/ hangers and joints of drain pipes P4. check drain pipes level P5. install insulation accordingly 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> k1. Interpret piping drawing k2. Understand material specifications k3. Understand importance of air vent
B-14 Mount supply and return air (Duct) terminals	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Check duct rout according to drawing P2. Verify duct size according to drawing P3. Check hangers and joints of duct P4. Check duct joints by smoke/ light test P5. Check insulation accordingly 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Interpret duct drawing K2. Understand material specifications K3. Describe duct testing standards
B-15 Seal structural penetration	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Seal structure opening during installation accordingly 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> k1. Understand sealant materials k2. Understand sealing methods k3.

Competency Unit	Performance Criteria	Knowledge and Understanding
B-16 Mount control systems	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Select position of control system accordingly P2. Place control equipment on prescribed location P3. Check control system performance 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Read control system diagram K2. Understand HVACR controls K3. Understand the application of HVACR controls
B-17 Refrigerant charging	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Purge the charging line accordingly P2. Charge the refrigerant P3. Start the system accordingly P4. Check performance 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand refrigerants K2. Understand Refrigerant charging process K3. Understand performance parameters

C. Remove existing HVAC unit

Overview: This Competency Standard focuses on the skills required to remove refrigerant and biohazards, look out energy sources, disconnect: electrical wiring from equipment, vent pipe, duct system, fuel pipes, refrigerant pipes, water pipes, from equipment, and remove HVAC equipment in removal of HVAC units. Your knowledge regarding removal of HVAC units procedures, criteria, recovery system, recycling system, safety rules, electrical hazards, mechanical hazards, tagging system, ventilation, fuel, duct, and refrigeration system, disconnection methods, interpret drawings, codes, standards, will be sufficient to provide you the basis for removal existing HVAC units work.

Competency Unit	Performance Criteria	Knowledge and Understanding
C-1 Remove refrigerant and biohazards	<p><i>Trainee must be able to...</i></p> <ul style="list-style-type: none"> P1. Connect refrigerant recovery system P2. Recover the refrigerant from system P3. Disconnect refrigerant recovery system P4. Recycle the recovered refrigerant 	<p><i>You need to know and understand...</i></p> <ul style="list-style-type: none"> K1. Understand biohazards K2. Understand use of recovery system K3. Understand recycling process
C-2 Lock out energy sources	<p><i>Trainee must be able to...</i></p> <ul style="list-style-type: none"> P1. Disconnect main power source P2. Disconnect fuel supply system P3. Tag out system 	<p><i>You need to know and understand...</i></p> <ul style="list-style-type: none"> K1. Understand safety rules K2. Understand electrical hazards K3. Understand mechanical hazards K4. Understand fuel biohazards K5. Understand tagging system
C-3 Disconnect electrical wiring from equipment	<p><i>Trainee must be able to...</i></p> <ul style="list-style-type: none"> P1. Identify wiring through coding P2. Remove electrical wiring P3. Remove control wiring 	<p><i>You need to know and understand...</i></p> <ul style="list-style-type: none"> K1. Understand wiring code system K2. understand of removing procedure of wiring

Competency Unit	Performance Criteria	Knowledge and Understanding
C-4 Disconnect vent piping from equipment	<p><i>Trainee must be able to...</i></p> <p>P1. Mark vent points accordingly P2. Disconnect vent piping from equipment</p>	<p><i>You need to know and understand...</i></p> <p>K1. Understand the ventilation system K2. Understand disconnecting methods</p>
C-5 Disconnect fuel piping to equipment	<p><i>Trainee must be able to...</i></p> <p>P1. Mark fuel points accordingly P2. Disconnect fuel piping from equipment</p>	<p><i>You need to know and understand...</i></p> <p>K1. Understand the fuel system K2. Understand disconnecting methods</p>
C-6 Disconnect duct work to equipment	<p><i>Trainee must be able to...</i></p> <p>P1. Mark duct points accordingly P2. Remove insulation P3. Disconnect duct from equipment</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand the duct system K2. Understand disconnecting methods</p>
C-7 Disconnect refrigerant piping to equipment	<p><i>Trainee must be able to...</i></p> <p>P1. Mark refrigerant piping points accordingly P2. Remove insulation P3. Disconnect piping from equipment</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand the refrigeration system K2. Understand disconnecting methods</p>
C-8 Disconnect water piping to equipment	<p><i>Trainee must be able to...</i></p> <p>P1. Mark water piping points accordingly P2. Close gate valve accordingly P3. Remove insulation P4. Disconnect water piping from equipment</p>	<p><i>You need to know and understand...</i></p> <p>K1. Understand the piping arrangement K2. Understand disconnecting methods K3. Understand working of valves</p>
C-9 Remove HVAC equipment	<p><i>Trainee must be able to</i></p> <p>P1. Arrange hoisting machines P2. Remove equipment from foundation</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand type hoisting machine K2. Understand safe handling procedure</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
C-10 Dispose off removed items	<p><i>Trainee must be able to</i></p> <p>P1. Collect removed items accordingly P2. Dispose off removed items</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand disposal procedure</p>

D. Test HVAC unit performance

Overview: This Competency Standard focuses on the skills required to check HVAC electrical characteristics, verify gas pressure, water pressure, design CFM, measure temperature, identify condition of combustion chamber, measure relative humidity, check modes of operations, perform motor test, and compressor efficiency test in tests of HVAC units. Your knowledge regarding testing of HVAC units' performance procedures, criteria, standards, parameters, codes, will be sufficient to provide you the basis for testing HVAC units' performance work.

Competency Unit	Performance Criteria	Knowledge and Understanding
D-1 Check HVAC equipment electrical characteristics	<p><i>Trainee must be able to</i></p> <p>P1. Test earth leakage breaker P2. Test short circuit breaker P3. Check voltage at equipment accordingly P4. Check HVAC equipment current accordingly</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand basic electrical characteristics K2. Understand performance parameters</p>
D-2 Verify gas pressure at equipment	<p><i>Trainee must be able to</i></p> <p>P1. Install pressure gauges accordingly P2. Check performance parameters</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand pressure measurement system K2. Understand working of pressure gauges K3. Understand pressure rating of HVAC equipment</p>
D-3 Verify water supply to equipment	<p><i>Trainee must be able to</i></p> <p>P1. Check the water flow switch P2. Install pressure gauges accordingly P3. Check performance parameters</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand pressure measurement system K2. Understand working of pressure gauges K3. Understand pressure rating of hydronic system</p>
D-4 Verify design CFM	<p><i>Trainee must be able to</i></p> <p>P1. Check the CFM at fan outlet P2. Check the CFM at room outlet P3. Compare with rating CFM accordingly</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand use of velocity meter K2. Understand calculation of CFM</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
D-5 Measure Temperature	<p><i>Trainee must be able to</i></p> <p>P1. Check water temperature accordingly P2. Check Air temperature P3. Check refrigerant temperature</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand temperature unit system K2. Understand comfort levels K3. Understand rating temperature of HVAC equipment</p>
D-6 Identify condition of combustion chamber	<p><i>Trainee must be able to</i></p> <p>P1. Check the fuel supply P2. Check flame P3. Check temperature of combustion chamber P4. Check condition of flue gases</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand constituent of Air K2. Understand different type of flame K3. Understand calorific values of fuels</p>
D-7 Measure relative humidity	<p><i>Trainee must be able to</i></p> <p>P1. Check humidity with humidistat</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand psychometric properties of Air K2. Understand relative humidity K3. Understand use of humidistat</p>
D-8 Check modes of operation	<p><i>Trainee must be able to</i></p> <p>P1. Check heating mode P2. Check cooling mode P3. Check dry mode</p>	<p><i>You need to know and understand</i></p> <p>K4. Understand refrigeration cycle K5. Understand HVAC symbols</p>
D-9 Perform motor Test(s)	<p><i>Trainee must be able to</i></p> <p>P1. Check alignment P2. Check noise level with dB meter P3. Check Vibration</p>	<p><i>You need to know and understand</i></p> <p>K1. Understand alignment methods K2. Understand use of dB meter</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
D-10 Perform Compressor Efficiency Test	<p><i>Trainee must be able to</i></p> <ul style="list-style-type: none"> P1. Check suction pressure P2. Check discharge pressure P3. Check noise level by dB meter P4. Check current 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand compressor operation K2. Understand compressor suction and discharge pressure K3. Understand current parameters

E. Conduct Preventive Maintenance on HVAC Equipment

Overview: This Competency Standard focuses on the skills required to inspect HVAC system components, heat exchanger, clean burners, blowers, air filter, and replace filters, belts, lubrication HVAC motors, and bearing, adjust belt alignment and tension in conduct preventive maintenance of HVAC units. Your knowledge regarding preventive maintenance schedule, parameters, use of chemical, servicing, lubrication, replacing procedures, methods, criteria, interpret drawings, codes, standards, will be sufficient to provide you the basis for preventive maintenance of HVAC work.

Competency Unit	Performance Criteria	Knowledge and Understanding
E-1 Inspect HVAC system components	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Check drain system P2. Check electrical components P3. Check mechanical components P4. Check physical condition of evaporator P5. Check physical condition of condenser P6. Fill the preventive maintenance chart 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand preventive maintenance schedule K2. Understand the maintenance parameters
E-2 Clean heat exchangers	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Remove air filter P2. Clean evaporator coil P3. Clean condenser coil P4. Clean drain pipes 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand cleaning process K2. Understand use of chemical
E-3 Clean burners	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Dismantling burners P2. Remove carbon fire nozzle P3. Re-assemble burners 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand construction of burners K2. Understand method of servicing

Competency Unit	Performance Criteria	Knowledge and Understanding
E-4 Clean blower assembly	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Dismantle blower assembly P2. Clean parts P3. Lubricate moving parts P4. Re-assemble blower 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand construction of blower assembly K2. Understand method of lubrication
E-5 Clean air filters	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Remove air filter P2. Clean air filter P3. Re-fix air filter 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand cleaning method of air filter
E-6 Replace filters	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Check physical condition of filter P2. Remove filter P3. Replace filter 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand type of filters K2. Understand replacing procedure
E-7 Lubricate HVAC motors and bearings	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Dismantle motor P2. Check bearing P3. Lubricate bearing 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand construction of motor K2. Understand type of lubricant K3. Understand method of lubrication
E-8 Replace belts	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Check the belts P2. Replace belts 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand type of belts K2. Understand replacement procedure
E-9 Adjust belt alignment and tension	<p><i>Trainee must be able to:</i></p> <ul style="list-style-type: none"> P1. Check the alignment P2. Check the noise level 	<p><i>You need to know and understand</i></p> <ul style="list-style-type: none"> K1. Understand alignment methods K2. Understand use of alignment tools

Competency Unit	Performance Criteria	Knowledge and Understanding
	P3. Align the belt	K3. Understand alignment procedure

F. Repair Refrigeration Cycle

Overview: This Competency Standard focuses on the skills required to obtain replacement parts, replace motors, compressor, refrigerant dryers, valves, control, electrical parts, sensors, heat exchangers, gas kits, and repair mechanical damages in repair of Refrigeration Cycle of HVAC units. Your knowledge regarding dismantling procedure and installation of parts, methods, interpret drawings, codes, standards, will be sufficient to provide you the basis for repair refrigeration cycle of HVAC units work.

Competency Unit	Performance Criteria	Knowledge and Understanding
F-1 Obtain replacement part(s)	P1. Check all mechanical components P2. Prepare requisition P3. Received from store	K1. Understand checking procedure K2. Understand specification of parts K3. Understand requisition procedure
F-2 Replace motors	P1. Remove electrical connections P2. Dismantle motor P3. Replace motor P4. Align motor P5. Connect electrical supply	K1. Understand dismantling procedure K2. Understand motor installation procedure
F-3 Replace compressors	P1. Remove electrical connections P2. Disconnect refrigerant pipes P3. Dismantle compressor P4. Replace compressor P5. Connect refrigerant pipes P6. Connect electrical supply	K1. Understand dismantling procedure K2. Understand compressor installation procedure
F-4 Replace refrigeration dryers	P1. Dismantle drier P2. Replace drier	K1. Understand dismantling procedure K2. Understand drier installation procedure

Competency Unit	Performance Criteria	Knowledge and Understanding
F-5 Replace valves	P1. Dismantle valves P2. Replace valves	K1. Understand dismantling procedure K2. Understand valves installation procedure
F-6 Replace controls	P1. Dismantle control P2. Replace control	K1. Understand dismantling procedure K2. Understand valves installation procedure
F-7 Repair electrical wiring	P1. Check electrical connections P2. Check insulation	K1. Understand basic electricity K2. Understand use of insulation test
F-8 Replace electrical parts	P1. Remove electrical connections P2. Replace electrical parts P3. Connect electrical connections	K1. Understand replacement procedure
F-9 Replace Electronics circuits/cards	P1. Remove electronics cards P2. Replace electronics cards	K1. Understand electronics card replacement procedure
F-10 Replace sensors	P1. Remove sensors P2. Replace sensor	K1. Understand sensors replacement procedure

Competency Unit	Performance Criteria	Knowledge and Understanding
F-11 Replace heat exchangers	P1. Remove condenser P2. Remove evaporator P3. Replace condenser P4. Replace evaporator	K1. Understand replacement procedure
F-12 Replace gas kits	P1. Remove gas kits P2. Replace gas kits	K1. Understand replacement procedure of gas kits
F-13 Repair mechanical Damages	P1. Align door P2. Repair hinges P3. Repair door handle P4. Replace door liner P5. Repair door cap P6. Adjust levelling foot screw	K1. Understand minor repair procedure

G. Develop Professionalism

Overview: The competency standard is designed to differentiate professionalism and being professional. This way of being is made up of appearance, manner, communication, interacting, attitudes, approach, skills and openness to grow. Professionalism is a combination of taught aspects, like knowledge and skills, and learning gained through experience.

Competency Unit	Performance Criteria	Knowledge and Understanding
G1 - Communicate with Co-Workers	Trainee will be able to : P1. Communicate within a department. P2. Communication with other departments. P3. Dealing with vendors. P4. Interaction with other organisations. P5. Using various media to communicate effectively.	Trainee will be able to : K1. Identify factors required to communicate effectively and precisely within same organisation. K2. Explain elements required to deal with vendors and the other organisations. K3. Justify the appropriate use of electronic and relative media as per need
G2 - Manage Time	Trainee will be able to: P1. Manage time to complete the assigned work. P2. Manage workload as per task. P3. Meet the specific deadlines. P4. Handle time division with co-workers.	Trainee will be able to : K1. Identify the importance of time division and allocation according to task priorities, involving management and co-workers.

Competency Unit	Performance Criteria	Knowledge and Understanding
G3 - Upgrade Skills	Trainee will be able to : P1. Participate in Skill test. P2. Attend seminars / workshops. P3. Involve in competitions time to time. P4. Perform market research. P5. Analyse upcoming market trends.	Trainee will be able to : K1. Describe the importance of trends and market research. K2. Identify the need of skills sets by getting involved in seminars, workshops and competitions.
G4 - Keep the workplace clean	Trainee will be able to : P1. Keep their workplace organised. P2. Ensure clean working environment.	Trainee will be able to : K1. Describe the importance of clean and organised workplace.
G5 - Work in a team	Trainee will be able to : P1. Demonstrate good team skills. P2. Carry an appropriate appearance. P3. Show comfort and tolerance. P4. Present and observe good work ethics.	Trainee will be able to : K1. Identify the importance of being a good team player.

Competency Unit	Performance Criteria	Knowledge and Understanding
<p>G6. Ensure Health and Safety</p>	<p>Trainee will be able to :</p> <p>P1. Store all flammables in proper safe place</p> <p>P2. Ensure the proper ventilation of the workplace</p> <p>P3. Check Pattern drums and pattern wheels totally guarded</p> <p>P4. Make sure Isolation equipment fitted according to manufacturer's instructions</p> <p>P5. Fit Positive feed drive belts with a suitable guard according to given instructions</p> <p>P6. Adjust Electrical interlocking guards to rotating cylinder machines</p> <p>P7. Fit Inching buttons to all machines and readily distinguishable by touch</p> <p>P8. Check Guards are fitted on hose machines where a full cabinet base is not provided</p> <p>P9. Check Drip trays are provided for each machine</p> <p>P10. Make sure Gantry systems of yarn support guarded</p> <p>P11. Confirm Emergency stop buttons are immediately accessible and identifiable</p> <p>P12. Check Creeling operations - musculoskeletal strains and RSI aspects of</p>	<p>Trainee will be able to :</p> <p>K1. Identify the materials which can caught fire</p> <p>K2. Classify emergency situations</p> <p>K3. Define the importance of following operating instructions given for tools</p>

Competency Unit	Performance Criteria	Knowledge and Understanding
	<p>long term hand or arm movements reduced as much as possible</p> <p>P13. Make sure Safe systems of work for access for threading of yarn are working properly</p> <p>P14. Check Safe system of work for removal of rolls or layers of fabric</p> <p>P15. Verify Half hose and sock machines – safe system of work for removing work from the bin</p> <p>P16. Press offs - wire hook only inserted when machine is stationary</p> <p>P17. Clean Drip trays regularly</p> <p>P18. Ensure Machine handle always left at rest before machine is started</p> <p>P19. Verify Safe system of work in place to prevent operators wearing loose clothing, jewellery, long hair and unsuitable footwear</p>	

List of tools and equipment

Documents, policies and guidelines

Item Description	Quantity	Item Description	Quantity
Air measurement tools	5 set	Recovery machines Refrigerant gauge	5 set
Allen key set	20 set	Ring spinner set (inch)	20 nos
Bench vice	20 nos	Ring spinner set (mm)	20 nos
Brake	5 set	Riveting gun	5 set
Capillary tube cleaner	20 set	Roll cutter	5 set
Center punch	20 nos	Roll former	5 set
Chisels	20 nos	Saws (complete with blade)	20 nos
Clamp on amp meter	5 nos	Scales	20 nos
Combustion analysis tools	5 set	Scissors	20 nos
Digital thermometer	5 set	Sheer	20 nos
Draft gauge	5 set	Shovel	5 nos
Drills	20 set	Sight glass	5 nos
File set	20 set	Sling psychomotor	5 nos
Filler gauge	20 set	Soldering iron	20 nos
Flare tools	20 set	Sprit level	5 nos
Gas charging adopter	5 set	Steel rule	20 nos
Grinders	5 nos	Swaging tools	5 set
Hollow punch	20 nos	Swedge	5 nos
Ladders	5 set	Tap and die tools Tachometer	5 set

Leak detectors	5 set	Tin cutter	5 nos
Mega-meter complete set	5 nos	Torch	5 set
Micron gauge	5 set	Try square	20 nos
Multi-meter	20 nos	Tube bender	5 set
Nitrogen tank	5 nos	Vacuum cleaner	5 nos
Piercing valve	20 nos	Vacuum pumps	5 set
Pinch off tool	20 nos	Vernier calipers	20 nos
Pipe cutter (for GI Pipes)	20 nos	Wire brush	20 nos
Pipe threads	5 set	Wire gauge	5 set
Pipe vice	5 set	Wrenches (assorted)	5 set
Pliers	20 nos	Screw driver	20 set
Pressure temp. measuring tools	5 set	Hammer set (MS, copper, rubber)	5 set
Pulley puller	5 set	Hand Drilling Machine	5 nos
Reamers (Copper)	20 set	Crimping Tool	5 set
Oxy Acetylene gas cylinder/ Oxy	5 set	Soldering Iron	20 nos
Blow torch	5 set	Dry bulb & wet bulb thermometer	5 set
Compressor	5 set	Halide torch	5 set
Empty cylinder for refrigerant	5 set	Compressor condenser	5 set
Nitrogen cylinder with two stage regulator	5 set	Evaporator	5 nos
Different types of electric motors	5 each	Expansion device/ capillary	



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