

# ELECTRONIC HOME APPLIANCES TECHNICIAN



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## COMPETENCY STANDARDS

National Vocational Certificate Level 2

Version 1 - March 2014



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## A. Ensure Occupational Health & Safety

**Overview:** This Competency Standard focuses on the skills required to ensure occupational health & safety in home appliances repair work, in accordance with the organization's approved guidelines and procedures. You will be expected to apply personal safety, tools and equipment safety, environmental safety and safety measures according to job. Your knowledge regarding ensure occupational health and safety, personal protective equipment, procedure, and job requirement work will be sufficient to provide you the basis for home appliance repair work.

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>A1.</b> Apply personal safety measures	<p><b><i>You must be able to:</i></b></p> <p>P1. Use of general Personal Protective Equipment accordingly            P2. Use of protective cloth            P3. Remove hazardous jewelleryes</p>	<p><b><i>You need to know and understand:</i></b></p> <p>K1. Explain Personal Protective Equipment            K2. Explain hazards associated to job</p>	<p>PPE equipment            First Aid box            Personal Protective equipment according to jobs</p>
<b>A2.</b> Apply Tools and equipment safety measures	<p><b><i>You must be able to:</i></b></p> <p>P1. Identify tools according to job            P2. Check tools condition            P3. Use of tools according to job            P4. Calibrate minor errors of measuring tools            P5. Maintain tools according to job.            P6. Ensure service tag according to job</p>	<p><b><i>You need to know and understand...</i></b></p> <p>K1. Explain proper use of tools            K2. Brief checking criteria of tool            K3. Brief safety precaution of tools equipment            K4. Describe safety hazards of equipment</p>	<p>Standard tool box</p>

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>A3.</b> Apply environment safety measures	<b><i>You must be able to...</i></b>  P1. Ensure worksite house keeping P2. Ensure adequate lighting and ventilation	<b><i>You need to know and understand...</i></b>  K1. Explain housekeeping of jobsite K2. Explain emergency rule statement	
<b>A4.</b> Apply safety measures according to job	<b><i>You must be able to:</i></b>  P1. Ensure work permit/ order P2. Use first aid kits P3. Use of fire extinguisher according to hazards P4. Ensure isolation of appliance	<b><i>You need to know and understand:</i></b>  K1. Explain work permit K2. Explain barricade of jobsite K3. Explain worksite hazards	

## B. Perform Basic Installation of Home Appliances

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>B1.</b> Use Installation manual	<p><b>You must be able to:</b></p> <p>P1. Prepare tools and equipment according to instruction manual            P2. Unpack equipment accordingly            P3. Inspect of equipment and accessories</p>	<p><b>You need to know and understand:</b></p> <p>K1. Read equipment drawing            K2. Brief instruction manual            K3. Unpacking procedure of equipment            K4. Explain installation procedure            K5. Explain operational procedure</p>	
<b>B2.</b> Install appliances according to manual	<p><b>You must be able to:</b></p> <p>P1. Visit the location of installation of equipment            P2. List tools for installation            P3. Arrange human resources            P4. Mark the location of equipment            P5. Fix the foundation/ base frame according to job            P6. Position the equipment            P7. Attach accessories accordingly</p>	<p><b>You need to know and understand:</b></p> <p>K1. Read equipment drawing            K2. Explain alignment procedure            K3. Explain installation procedure            K4. Explain measuring units            K5. Explain basic measuring procedure</p>	
<b>B3.</b> Perform test run	<p><b>You must be able to:</b></p> <p>P1. Ensure proper connections of equipment            P2. Check earth leakage of equipment            P3. Perform leakage test accordingly            P4. Check mains supply</p>	<p><b>You need to know and understand:</b></p> <p>K1. Explain type of connections            K2. Explain importance of earthing system            K3. Explain earthing procedure            K4. Brief leakage test</p>	

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
	P5. Perform test run P6. Observe operating status of equipment accordingly	K5. Explain specification of equipment K6. Explain functionality of equipment	



## C. Perform Repairing of Home Appliance

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>C1.</b> Perform test run	<b><i>You must be able to:</i></b> P1. Check short circuit P2. Connect to mains supply P3. Perform test run as described P4. Note parameters	<b><i>You need to know and understand:</i></b> K1. Explain electrical circuits K2. Read instruction manual K3. Explain procedure of test run of appliances K4. Explain operating specification	Series board Test lamp Single phase test Clamp on meter Multi meter Insulation tester
<b>C2.</b> Dismantle appliance	<b><i>You must be able to:</i></b> P1. Ensure complete isolation P2. Use standard tools according to job P3. Tag the wires of appliances accessories P4. Adopt proper method of dismantling	<b><i>You need to know and understand:</i></b> K1. Read instruction manual K2. Identify different tools K3. Explain procedure of dismantling of appliances K4. Explain wire tagging system	Screw driver set (Star set) Pliers set (combination, cutter, long nose, lock opener,) Cramping tools set Ale key set Retch wrench set Ring spanner set Open spanner set Hacksaw mini Hacksaw with blade Hammer set (400g) Rubber hammer File set Puller set Torque screw driver set De-Soldering gun Soldering iron (100w) Electrician knife Multi meter Single phase tester

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>C3.</b> Diagnose fault of appliances	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Inspect physical condition</li> <li>P2. Check electrical parts of appliance</li> <li>P3. Check mechanical parts</li> <li>P4. Check control module</li> <li>P5. Check magnetron</li> <li>P6. Check rectifier of magnetron</li> <li>P7. Check front panel</li> <li>P8. Tag faulty component/ parts</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain working principle of appliances</li> <li>K2. Describe functionality of appliances (specification)</li> <li>K3. Describe physical parts of appliances</li> <li>K4. Explain testing procedure of parts</li> <li>K5. Explain electrical circuits and components</li> <li>K6. Explain block diagram</li> </ul>	<ul style="list-style-type: none"> <li>Series board</li> <li>Test lamp</li> <li>Single phase test</li> <li>Clamp on meter</li> <li>Multi meter</li> <li>Insulation tester</li> </ul>
<b>C4.</b> Repair of washing machine	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Fix rotor set</li> <li>P2. Fix mechanical fault</li> <li>P3. Fix electrical fault</li> <li>P4. Adjust control accessories</li> <li>P5. Align accessories</li> <li>P6. Fix front panel</li> <li>P7. Fix control module</li> <li>P8. Fix leakages</li> <li>P9. Demonstrate test run</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain wash phenomena</li> <li>K2. Explain method of mechanical fixing fault</li> <li>K3. Explain method of electrical fixing fault</li> <li>K4. Explain adjustment of accessories</li> </ul>	

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>C5.</b> Repair of microwave	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Fix safety fuse</li> <li>P2. Fix mechanical fault</li> <li>P3. Fix electrical fault</li> <li>P4. Adjust control accessories</li> <li>P5. Align accessories</li> <li>P6. Fix control module</li> <li>P7. Fix magnetron</li> <li>P8. Demonstrate test run</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain working principle of magnetron</li> <li>K2. Explain heating process of microwave</li> <li>K3. Explain safety precaution of high voltage accessories</li> <li>K4. Explain method of mechanical fixing fault</li> <li>K5. Explain method of electrical fixing fault</li> <li>K6. Explain adjustment of accessories</li> <li>K7. Explain thermostat device</li> <li>K8. Explain rectification</li> </ul>	
<b>C6.</b> Repair electrical Iron	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Fix de-scaling of surface</li> <li>P2. Fix nozzles</li> <li>P3. Fix thermostat</li> <li>P4. Fix electrical fault</li> <li>P5. Adjust control accessories</li> <li>P6. Demonstrate test run</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain working principle of Iron</li> <li>K2. Explain heating process of Iron</li> <li>K3. Explain de-scaling process</li> <li>K4. Explain safety precaution of high temperature/ voltage accessories</li> <li>K5. Explain method of mechanical fixing fault</li> <li>K6. Explain method of electrical fixing fault</li> <li>K7. Explain adjustment of accessories</li> <li>K8. Explain thermostat device</li> </ul>	

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>C7.</b> Repair of vacuum cleaner	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Clean filter</li> <li>P2. Fix housing</li> <li>P3. Fix electrical fault</li> <li>P4. Adjust control accessories</li> <li>P5. Demonstrate test run</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain working principle of vacuum cleaner</li> <li>K2. Explain method of mechanical fault fixing</li> <li>K3. Explain method of electrical fault fixing</li> <li>K4. Explain adjustment of accessories</li> <li>K5. Explain speed control process</li> </ul>	Micron gauge Tachometer
<b>C8.</b> Repair of fans	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Fix motor bushes</li> <li>P2. Perform lubrication</li> <li>P3. Fix mechanical faults</li> <li>P4. Align fan blade</li> <li>P5. Align parts and accessories</li> <li>P6. Fix electrical fault</li> <li>P7. Fix control parts</li> <li>P8. Adjust control accessories</li> <li>P9. Demonstrate test run</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain working principle of motor</li> <li>K2. Explain method of mechanical fault fixing</li> <li>K3. Explain method of electrical fault fixing</li> <li>K4. Explain adjustment of accessories</li> </ul>	
<b>C9.</b> Repair of emergency light	<p><b><i>You must be able to:</i></b></p> <ul style="list-style-type: none"> <li>P1. Fix rectification section</li> <li>P2. Fix switching section</li> <li>P3. Fix output section</li> <li>P4. Fix PCB</li> <li>P5. Fix electrical fault</li> <li>P6. Fix control module</li> <li>P7. Demonstrate test run</li> </ul>	<p><b><i>You need to know and understand:</i></b></p> <ul style="list-style-type: none"> <li>K1. Explain emergency light working procedure</li> <li>K2. Explain batteries</li> <li>K3. Explain rectification</li> <li>K4. Read circuit diagram</li> <li>K5. Explain diode, LEDs, PCB</li> <li>K6. Explain transistor basics</li> </ul>	

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
		K7. Explain testing procedure of electronics components	
<b>C10.</b> Repair of toaster	<p><b><i>You must be able to:</i></b></p> <p>P1. Fix thermostat  P2. Fix spring  P3. Fix mechanical faults  P4. Align parts and accessories  P5. Fix electrical fault  P6. Fix control parts  P7. Adjust control accessories  P8. Demonstrate test run</p>	<p><b><i>You need to know and understand:</i></b></p> <p>K1. Explain working principle of toaster  K2. Explain safety precautions of toaster  K3. Explain method of mechanical fault fixing  K4. Explain method of electrical fault fixing  K5. Explain adjustment of accessories</p>	
<b>C11.</b> Repair of kitchen appliances	<p><b><i>You must be able to:</i></b></p> <p>P1. Fix carbon brushes  P2. Fix leakage seals  P3. Fix armature bushes  P4. Fix mechanical fault  P5. Fix electrical fault  P6. Adjust control accessories  P7. Align accessories  P8. Fix front panel  P9. Demonstrate test run</p>	<p><b><i>You need to know and understand:</i></b></p> <p>K1. Explain working principle of motor  K2. Explain method of mechanical fixing fault  K3. Explain method of electrical fixing fault  K4. Explain adjustment of accessories</p>	
<b>C12.</b> Assemble appliance	<p><b><i>You must be able to:</i></b></p> <p>P1. Ensure standard tools according to job  P2. Make internal connections</p>	<p><b><i>You need to know and understand:</i></b></p> <p>K1. Describe Identification of different tools  K2. Explain Usage of different tools &amp;</p>	

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
	P3. Perform proper method of assembling P4. Check physical condition of appliances P5. Perform leakage test P6. Check mains supply P7. Perform test run P8. Demonstrate appliances	equipment K3. Explain internal wiring diagram K4. Explain procedure of assembling K5. Explain procedure of test run K6. Explain demonstration of appliances	

## D. Perform Replacement Components of Home Appliances

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>D1.</b> Identify faulty component	<p><b>You must be able to:</b></p> <p>P1. Ensure availability of parts accordingly            P2. Prepare request of parts            P3. Inspect parts physically            P4. Inspect parts functionality</p>	<p><b>You need to know and understand:</b></p> <p>K1. Explain specification of parts            K2. Explain functionality of parts            K3. Explain store requisition procedure            K4. Explain checking procedure of parts</p>	
<b>D2.</b> Replace electrical components	<p><b>You must be able to:</b></p> <p>P1. Remove faulty component            P2. Install new component            P3. Check connections            P4. Perform Insulation of connection</p>	<p><b>You need to know and understand:</b></p> <p>K1. Explain electrical circuits            K2. Explain electrical joints/ connections            K3. Explain insulation procedure            K4. Describe procedure of replacement</p>	
<b>D3.</b> Replace mechanical parts	<p><b>You must be able to:</b></p> <p>P1. Remove faulty component            P2. Install new component            P3. Adjust new component            P4. Perform lubrication accordingly</p>	<p><b>You need to know and understand:</b></p> <p>K1. Describe procedure of replacement            K2. Explain adjustment procedure            K3. Explain lubrication procedure</p>	
<b>D4.</b> Replace module	<p><b>You must be able to:</b></p> <p>P1. Remove faulty module            P2. Install new module            P3. Adjust new module            P4. Check functionality of module</p>	<p><b>You need to know and understand:</b></p> <p>K4. Describe procedure of replacement            K5. Explain adjustment procedure            K6. Explain function of module operation</p>	

## E. Perform Preventive Maintenance

Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
<b>D1.</b> Inspect equipment	<p><b>You must be able to:</b></p> <p>P1. Inspect physical condition            P2. Check electrical components            P3. Check mechanical components            P4. Fill checklist for preventive maintenance</p>	<p><b>You need to know and understand:</b></p> <p>K1. Explain preventive maintenance schedule            K2. Explain specification of parts            K3. Explain functionality of parts            K4. Explain component life cycle            K5. Explain maintenance parameters of parts</p>	
<b>D2.</b> Clean equipment	<p><b>You must be able to:</b></p> <p>P1. Arrange cleaning agent            P2. Clean physical component            P3. Clean filters            P4. Clean electrical components/connections</p>	<p><b>You need to know and understand:</b></p> <p>K1. Explain cleaning schedule            K2. Explain functionality of parts            K3. Explain component life cycle            K4. Explain cleaning parameters of parts</p>	
<b>D3.</b> Lubrication mechanical parts	<p><b>You must be able to:</b></p> <p>P1. Arrange lubrication agent            P2. Clean moving parts            P3. Apply lubrication accordingly</p>	<p><b>You need to know and understand:</b></p> <p>K1. Explain lubrication schedule            K2. Explain type of lubrication            K3. Explain lubricants life cycle            K4. Explain procedure of lubrication process</p>	
<b>D4.</b> Align equipment	<p><b>You must be able to:</b></p> <p>P1. Arrange alignment tools and equipment</p>	<p><b>You need to know and understand:</b></p> <p>K1. Describe aligning tools            K2. Explain procedure of aligning</p>	



Competency Unit	Performance Criteria	Knowledge and Understanding	Tools & Equipment
	P2. Perform alignment of components P3. Check noise level	K3. Explain basic principles of alignment K4. Brief noise level checking procedure	
<b>D5.</b> Ensure parts life cycle	<b><i>You must be able to:</i></b> P1. Check output ratio P2. Check physical condition	<b><i>You need to know and understand:</i></b> K1. Explain preventive maintenance schedule K2. Explain specification of parts K3. Explain functionality of parts K4. Explain component life cycle K5. Explain maintenance parameters of parts	
<b>D6.</b> Demonstrate equipment	<b><i>You must be able to:</i></b> P1. Arrange power source P2. Attach accessories accordingly P3. Perform test run P4. Demonstrate accordingly	<b><i>You need to know and understand:</i></b> K1. Explain functionality of parts K2. Brief demonstration procedure of equipment	

## Personal Protective Equipment (PPEs)

S.No.	Hand Tools	Quantity
1	Coveralls	
2	Safety helmet	
3	Hand gloves	
4	Ear plug (Ear protection)	
5	Safety goggles	
6	Safety shoes	
7	Safety face shield	
8	Splash goggles	
9	Full face gas mask	
10	Apron (Acid suit)	
11	Breathing apparatus	
12	Dust mask	

## List of tools and equipment

S.No.	Hand Tools	Quantity
1	Combination spanner set	
2	Allen key set	
3	Hammer	
4	Files set	
5	Screw driver set	
6	Combination plier	
7	Nose plier	
8	Crow bar	
9	Hacksaw	
10	socket set	
11	Punch set	
12	Number punch	
13	Impact wrench	
14	Pipe wrench	
15	Adjustable wrench	
16	Chain wrench	
17	Circlip plier	
18	Inspection mirror	
19	Packing puller	
20	Measuring tape	
21	Scriber	
22	Clipper set	
23	Gauges (filler, universal, thread, angular, radius, depth, height, slip, bore, telescope, go /not go,	
24	Dial indicator	
25	Micrometer	
26	Vernier clipper	
27	Vibration meter	
28	Stethoscope	
29	Laser distance meter	
30	Tachometer	
31	Theodolite	

32	Temperature gun (laser)	
33	dB meter	
34	Pullers set	
35	Bolt extractor	

**Documents, policies and guidelines**

Kinds of seals and packing	Combination Spanner set
Type of Lubricating oils and greases	
Types of bearing	
Types of coupling	
Type of gears	
Types of valves	

## List of consumable material

S.No.	Consumable Material	Quantity
1	Cotton waste	
2	Anti-seized compound	
3	Anti-corrosion spray	
4	Lapping paste (Amery paste)	
5	Emery paper	
6	Grinding disk	
7	Cutting disk	
8	Lapping stone	
9	Cotton gloves	
10	Silicon	
11	Teflon tape	
12	Wire brush	
13	Painting brush	
14	Disposable coverall	
15	Lock tight	
16	Emery flower wheel	
17	Alignment shims	
18	Grease	
19	Kerosene oil	

