

1. Title	Use air-conditioning and refrigeration instruments and tools
2. Code	EMCUMA101A
3. Range	Use typical air-conditioning and refrigeration instruments and tools to perform installation, repair and maintenance in workplaces with air-conditioning and refrigeration systems.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Working principles of air-conditioning and refrigeration instruments and tools</p> <ul style="list-style-type: none"> <li>◆ Understand basic working principles of instruments and tools, including: <ul style="list-style-type: none"> <li>• Functions and working principles of dry-bulb thermometer, web-bulb thermometer, anemometer, vacuum pump, gauge manifold and vacuum pressure gauge, etc.</li> <li>• Functions of copper tubing tools</li> <li>• Functions of insulation work tools</li> </ul> </li> </ul> <p>6.2 Operation method of air-conditioning and refrigeration instruments and tools</p> <ul style="list-style-type: none"> <li>◆ Use air-conditioning and refrigeration instruments, including: <ul style="list-style-type: none"> <li>• Anemometer</li> <li>• Vacuum pump</li> <li>• Gauge manifold</li> <li>• Vacuum pressure gauge</li> <li>• Use dry-bulb thermometer and web-bulb thermometer to measure the dry-bulb temperature and web-bulb temperature of objects</li> </ul> </li> <li>◆ Use copper tubing tools <ul style="list-style-type: none"> <li>• know how to use tube cutter, flaring tool, swaging tool and tube bender for cutting, flaring , swaging and bending copper tubes</li> <li>• know how to fabricate simple copper tube assemblies, including cutting, flaring,swaging, bending, flare joining , and performing leak checking for copper tube assemblies</li> </ul> </li> <li>◆ Use refrigerant leak detector <ul style="list-style-type: none"> <li>• Know how to use soap solution and electronic leak detector to detect refrigerant leaks from the refrigeration system</li> </ul> </li> <li>◆ Identify and handle refrigerant cylinders <ul style="list-style-type: none"> <li>• Identify the types of refrigerant according to different colours of the refrigerant cylinders</li> <li>• Understand how to use refrigerant cylinders</li> <li>• Capable to store and transport refrigerant cylinders safely</li> </ul> </li> </ul>

7. Assessment Criteria	The integrated outcome requirements of this unit of competency are:  (i) Capable to use air-conditioning and refrigeration instruments correctly; and  (ii) Capable to operate air-conditioning and refrigeration tools, make simple copper tube assemblies, and perform installation, repair and maintenance works.
8. Remarks	This unit of competency is applicable to new entrants of air-conditioning and refrigeration engineering services.