

1. Title	Repair air-conditioning and refrigeration systems
2. Code	EMCUMA304A
3. Range	Repair air-conditioning and refrigeration systems in servicing stations or external sites.
4. Level	3
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Construction and operating principles of air-conditioning and refrigeration systems</p> <ul style="list-style-type: none"> <li>◆ Understand the construction and operating principles of air-conditioning and refrigeration systems, including the refrigerant piping, condenser, filter and evaporator, etc.</li> </ul> <p>6.2 Method of repairing air-conditioning and refrigeration systems</p> <ul style="list-style-type: none"> <li>◆ Clean and wash the air-conditioning and refrigeration systems, including: <ul style="list-style-type: none"> <li>• Air filter</li> <li>• Using nitrogen to flush the refrigerant piping</li> <li>• Water-cooled condenser and defouling</li> <li>• Air-cooled condenser</li> <li>• Evaporator</li> </ul> </li> <li>◆ Pressure leak check and vacuuming of refrigeration system <ul style="list-style-type: none"> <li>• Use nitrogen to perform pressure leak check for the refrigeration system</li> <li>• Vacuum the refrigeration system with the compressor</li> <li>• Vacuum the refrigeration system with the vacuum pump</li> </ul> </li> <li>◆ Charge the refrigeration system with refrigerant <ul style="list-style-type: none"> <li>• Determine the correct amount of refrigerant to be charged</li> <li>• Understand the advantages and disadvantages of charging refrigerant</li> <li>• Charge a large refrigeration system with refrigerant at the charging valve</li> <li>• Charge liquid refrigerant at the discharge valve of compressor</li> <li>• Charge vapour refrigerant at the suction valve of compressor</li> <li>• Charge refrigerant to a hermetic compressor</li> <li>• Know the methods of liquid charging and vapour charging of refrigerant</li> <li>• Understand the safety precautions for charging liquid refrigerant</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>◆ Evacuate air and water from the refrigeration system <ul style="list-style-type: none"> <li>• Understand the harm of air and water in the refrigeration system</li> <li>• Determine whether there is air and water in the refrigeration system</li> <li>• Evacuate the air from the refrigeration system</li> <li>• Evacuate the water from the refrigeration system</li> </ul> </li> <li>◆ Pump down and recover refrigerant from the refrigeration system <ul style="list-style-type: none"> <li>• Understand the purpose of pumping down and recovering the refrigerant</li> <li>• Pump down the refrigerant from the refrigeration system to the liquid receiver or condenser</li> <li>• Use a refrigerant recovering machine to recover the refrigerant from the refrigeration system to the refrigerant recovery cylinder</li> </ul> </li> <li>◆ Add and remove refrigerant oil <ul style="list-style-type: none"> <li>• Choose suitable refrigerant oil</li> <li>• Remove refrigerant oil from and add it to the hermetic reciprocating compressor</li> <li>• Remove refrigerant oil from and add it to the hermetic rotary compressor</li> <li>• Remove refrigerant oil from and add it to the open-type compressor</li> </ul> </li> </ul> <p>6.3 Professionalism in repairing air-conditioning and refrigeration systems ◆ Perform air-conditioning and refrigeration systems repairing according to safety regulations and code of practice as required by the law</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to repair air-conditioning and refrigeration systems properly and efficiently, including filling and recovering refrigerant and filling and exhausting coolant oil, according to safety regulations and code of practice.</p>
8. Remarks	<p>This unit of competency is suitable for training air-conditioning and refrigeration engineering personnel. The credit value of this unit of competency is set on the presumption that the person already possesses basic air-conditioning and refrigeration knowledge.</p>