



3T Services Training Centre

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**City & Guilds 2079 Category I ~ F-Gas and ODS Regulations
Competence Criteria Self Assessment**

We offer a number of training / assessment programs to suit the differing levels of candidate experience;

- A) 1 day ~ Assessment only
- B) 2 day ~ 1 day classroom based training, 1 day assessment
- C) 3 day ~ 2 days classroom based training, 1 day assessment
- D) 4 day ~ 3 days classroom based training, 1 day assessment
- E) 5 day ~ 3 days classroom based training, 1 day practical training, 1 day assessment

- A) Suitable for candidates who can perform all of the practical tasks and have an excellent knowledge of the following criteria.
- B) Suitable for senior experienced engineers who only need to review the course content prior to the assessment.
- C) Suitable for experienced engineers who have good retained knowledge of City & Guilds 2078 and now require the additional underpinning knowledge to update to the latest legislative requirements.
- D) Suitable for engineers who require a better understanding of the concepts of refrigeration & air conditioning, thermodynamics and the current legislation, but have sufficient skills to undertake the practical tasks mention below.
- E) Suitable for engineers who require a better understanding of the concepts of refrigeration & air conditioning, thermodynamics, the current legislation and also require a refresher to undertake the practical tasks mention below.

Note: All courses are aimed at candidates with prior experience within the refrigeration / air conditioning industries.

From the above choices, the sample questions sent and the required criteria listed, please sign to agree competency of the candidate(s) to undertake the course (please tick as appropriate)

A) B) C) D) E)

Candidate(s)			
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	
Line Manager			
Name		Signature	

3T Services Limited



City & Guilds 2079 Practical Tasks

- + Complete a brazed joint and install pipework to system
- + Examine pipework on system
- + Determine appropriate pressures to EN378
- + Carry out strength test
- + Carry out leak pressure test
- + Evacuate system to below 2 Torr / 2000 microns
- + Complete pressure testing and evacuation records
- + Charge zeotropic blend into system, record weight charged
- + Run system
- + Identify state of refrigerant in cylinder prior to charging
- + Identify state of refrigerant in system while running
- + Visually inspect system for leaks
- + Use gauges/thermometer/comparator/sight glass & log book to determine charge is correct by indirect leakage check
- + Use electronic leak detector to carry out a direct leak check
- + Complete leak check record
- + Connect & disconnect gauges to/from running system with minimal refrigerant loss from service valves
- + Connect & disconnect gauges to/from running system with minimal refrigerant loss from schraeder valves
- + Recover refrigerant from system into recover cylinder
- + Record weight of refrigerant recovered
- + Remove brazed joint test piece and inspect for penetration by cutting through joint
- + Drain oil from a compressor



City & Guilds 2079 Underpinning Knowledge

- ✚ Identify standard units of temperature, pressure, mass, density and enthalpy
- ✚ Describe basic theory of basic vapour compressions cycle, including key terms and use of basic p-h diagram.
- ✚ Describe the function of the four major components/processes (compressor, condenser, expansion device, evaporator)
- ✚ Identify condition/state of refrigerant (i.e. superheated vapour / 2 phase mix / subcooled liquid) by use of refrigerant comparator or service gauge.
- ✚ Determine reasonable operating conditions (saturated temperatures) for a condenser and evaporator, for a range of applications.
- ✚ Describe features of zeotropic blends
- ✚ Understand the function of and role / importance of monitoring system performance for indications that leakage has occurred from:
 - a. valves – service, pressure relief
 - b. thermostats / pressure controls
 - c. liquid line, receiver sight glasses and indicators
 - d. defrost controls
 - e. overloads
 - f. service gauge manifold and thermometer
 - g. oil control and separator systems
 - h. high pressure receivers
 - i. low pressure accumulators
- ✚ Describe climate change and the Kyoto Protocol.
- ✚ Understand direct and indirect Global Warming Potential (GWP) of the common HFC and HC refrigerants.
- ✚ Understand importance of energy efficiency on greenhouse gas emissions to the atmosphere
- ✚ Describe the basic requirements of Regulation (EC) No. 842/2006 and other relevant regulations.
- ✚ Describe the equipment records / commissioning data requirements to be recorded in such records.



- ✚ Identify potential leakage points of refrigeration / air conditioning and heat pump equipments
- ✚ State requirements and procedures for handling, storage, transportation and disposal of contaminated refrigerant and oil.
- ✚ Describe the function of a compressor and the risks of refrigerant leakage or release associated with it.
- ✚ Identify the state / condition of a compressor that could lead to refrigerant release.
- ✚ Describe the function of a condenser and the risks of refrigerant leakage or release associated with it.
- ✚ Identify the state / condition of a condenser that could lead to refrigerant release.
- ✚ Describe the function of an evaporator and the risks of refrigerant leakage or release associated with it.
- ✚ Identify the state / condition of an evaporator that could lead to refrigerant release.
- ✚ Describe the function of a thermostatic expansion valve and a capillary tube restrictor, and the risk of refrigerant release associated with them.
- ✚ Identify the state / condition of a thermostatic expansion valve and capillary tube restrictor that could lead to refrigerant release.
- ✚ Demonstrate knowledge of the potential of HCFC refrigerants to deplete ozone, and the effect of chlorine on ozone depletion. Identify the ODP of various HCFC refrigerants in use.
- ✚ Describe the basic requirements of Regulation (EC) 2037/2000 and the impact of the Montreal Protocol.
- ✚ Describe the hazards associated with refrigerant release, including
 - a. Cold burns
 - b. Asphyxiation
 - c. Thermal decomposition
 - d. CNS effect
 - e. Cardiac sensitisation
- ✚ Describe the hazards associated with Flame brazing
- ✚ Describe the hazards associated with pressure testing with nitrogen