REGULATED QUALIFICATION FRAMEWORK (RQF)

QUALIFICATION SPECIFICATION

- **LCL Awards Level 3 Award in Understanding the properties and use of flammable refrigerants in accordance with ACRIB specification (A2L, A2 and A3) 603/3615/8**

1. Area and scope of competence:

Understand properties of and the application of **all** A2L, A2 and A3 class flammable refrigerants. Including:

- RACHP system installation, testing, servicing and maintenance techniques
- Specific requirements when using different refrigerant classifications in various applications

The target groups for the qualification are those learners who are;

1. Updating occupational competence, continuous professional development and or obtaining a licence to practice
2. Preparing for further learning or training and/or developing knowledge and or skills in a subject area who are existing workers in the occupation seeking to extend their range of work

2. Qualification Framework:

The qualification comprises of 1 mandatory Unit;

Unit Title	Unit Reference Number	Type of Unit	Level	Credit Rating
Understanding the properties and use of flammable refrigerants in accordance with ACRIB specification	LCL-F3003	Knowledge and Practical	3	1

Qualification Structure:

- **LCL Awards Level 3 Award in Understanding the properties and use of flammable refrigerants in accordance with ACRIB specification (A2L, A2 and A3)**
  - **QAN -** (603/3615/8)
  - The Guided Learning Hours (GLH) are **6 hours**
  - The Total Qualification Time (TQT) is **10 hours**
  - The total credit required to achieve the qualification is **1**

Condition of certification:

Note: Certificates issued within this qualification specification are valid for a period of **5 years** from the date of issue**.**

3. Unit Grading Structure:

The learner is required to successfully pass one mandatory unit for this qualification to be awarded.

4. Unit specification:

LCL-F3003 Understanding the properties and use of flammable refrigerants in accordance with ACRIB specification (A2L, A2 and A3) (assessments via M/C and OP)

Learning Outcome 01: Understand the different classes of flammability as recognised by legislation, safety standards such as BS EN 378, ISO5149, BS EN 60335 and manufacturers' instructions. Understand specific health and safety.
The learner can:

1.01 Identify the hazards associated with these refrigerants:
- flammability
- low boiling point
- asphyxiation
- LFL
- UFL
- sources of ignition
- practical limits
- density

1.01 State and identify the commonly used refrigerant designations (eg "R" numbers, toxicity and flammability class).
1.02 State the requirements of specific risk assessments.
1.03 Identify the appropriate fire extinguishers for work on RACHP systems.

Learning Outcome 02: Understand the legislative and organisational procedures for installation, servicing, maintaining and decommissioning.
The learner can:

2.01 State the appropriate sources of health and safety information when installing, servicing, maintaining and de-commissioning of RACHP systems.
2.02 State the regulations, codes of practice, and industry recommendations appropriate to the installation, servicing, maintaining and de-commissioning of RACHP systems, including working with refrigerants.
2.03 State the location classification and charge limits for RACHP systems.
2.04 State charge size limitations for human comfort cooling and heating for air conditioning systems.

Learning Outcome 03: Understand the differences between different refrigerant classes in a variety of RACHP systems.
The learner can:

3.01 Identify the specific system features and components which apply to RACHP systems:
- electrical devices
- electrical enclosures
- associated electrical devices (including devices specifically designed for use with flammable refrigerants)
- compressors (including starter and associated electrics)

3.02 Identify the features and characteristics of:
- critical charge systems
- oil compatibility

3.03 State the properties, advantages and disadvantages of different classes of refrigerants including:
- leakage implications (direct and indirect)
- thermodynamic properties
- cooling capacity and energy efficiency
- density
- odour

3.04 Explain why these refrigerants are not suitable for retro-filling.
3.05 Identify typical applications of RACHP systems.

Learning Outcome 04: Understand the procedures for planning and preparing for work on RACHP systems.
The learner can:

4.01 State the requirements for completing a risk assessment for work on RACHP systems.
4.02 State the requirements for creating and maintaining a safe working area.
4.03 Identify appropriate tools and equipment for work on RACHP systems.

Learning Outcome 05: Be able to plan and prepare for work on RACHP systems.
The learner can:

5.01 Understand a location specific risk assessment.
5.02 Establish and maintain a safe working area.
5.03 Select tools, equipment and PPE for work on RACHP systems which are suitable for the refrigerant (including but not limited to refrigerant detector, ventilation fan, vacuum pump and recovery unit).

Learning Outcome 06: Understand the specific requirements for installing and testing RACHP systems.
The learner can:

6.01 Identify access category as designated in safety standards (BS EN 378, ISO 5149).
6.02 Identify the maximum refrigerant charge based on location classification.
6.03 Calculate the maximum charge based on the toxicity and practical limit.
6.04 Determine from calculations the system specific maximum charge.
6.05 State the methods and procedures for:
- strength testing
- tightness testing
- leak testing
- evacuation and dehydration

6.06 State the procedures for charging refrigerant into systems.
6.07 State the procedures for determining when charge is correct.
6.08 State the records to be completed prior to handover.
6.09 State the requirements for system labelling.
6.10 Understand the importance of following manufacturers' installation instructions.
6.11 Specify the information that should be provided to customers, including:
- operation of system and controls
- using only appropriately trained servicing personnel
- restrictions on the relocation of equipment
- compliance with the F-Gas Regulation where appropriate

Learning Outcome 07: Understand service and maintenance procedures.
The learner can:

7.01 Identify manufacturers' recommended replacement components for the following:
- electrical devices
- electrical enclosures
- associated electrical devices
- compressors (including starter and associated electrics)

7.02 State the importance of maintaining the integrity of certified electrical equipment.
7.03 State appropriate methods for accessing and sealing RACHP systems.
7.04 Specify the requirements for recovering refrigerant with regard to safety and environmental implications (including situations where it may be safe to vent less than 0.15kg of hydrocarbon refrigerant to atmosphere).
7.05 State the requirements for the safe use of recovery machines.
7.06 State the requirements for the safe use of vacuum pumps.

Learning Outcome 08: Be able to service and maintain RACHP systems.
The learner can understand how to:

8.01 Calculate the safe fill weight for the recovery cylinder (density difference between refrigerants).
8.02 Connect equipment in preparation for recovery.
8.03 Recover refrigerant to a prescribed pressure.
8.04 Follow a procedure by which they purge the circuit with inert gas (eg oxygen free nitrogen OFN), evacuate the circuit to a pressure of 0.3 abs, purge the circuit a second time with inert gas (eg OFN).
8.05 Remove the specified component while monitoring lower flammability level.
8.06 Replace the specified component while purging OFN through pipework if brazing.
8.07 Prove system is leak tight (containment).
8.08 Evacuate to below 2000 microns.
8.09 Re-charge with specified refrigerant weight.
8.10 Run system and check operation.
8.11 Remove charging equipment.
8.12 Seal system and complete leak test with appropriate equipment.
8.13 Complete service records as appropriate.

Learning Outcome 09: Understand the decommissioning procedures for RACHP systems.
The learner can:

9.01 Identify the safe procedures for handling, storage and disposal or recovery of refrigerant and other potentially hazardous materials.
9.02 Identify work sequences for decommissioning and making a system safe in accordance with appropriate industry procedures and manufacturers' instructions.

5. National Occupational Standard:

The Unit has a direct relationship with the National Occupational Standards for the areas of work contained within and has been written and approved by "ACRIB" – the Air Conditioning and Refrigeration Industry Board.

6. **RQF Descriptor Level 3.**

Knowledge descriptor: (the learner can)

- *Has factual, procedural and theoretical knowledge and understanding of a subject or field of work to complete tasks and address problems that while well-defined, may be complex and non-routine.*
- *Can interpret and evaluate relevant information and ideas.*
- *Is aware of the nature of the area of study or work.*
- *Is aware of different perspectives or approaches within the area of study or work.*

Skills Descriptor (the learner can)

- *Identify, select and use appropriate cognitive and practical skills, methods and procedures to address problems that while well defined, may be complex and non-routine.*
- *Use appropriate investigation to inform actions.*
- *Review how effective methods and actions have been.*

7. **Prior knowledge, skills or understanding which the learner is required to have before taking the qualification. (Pre-requisites)**

The learner must hold a valid F-Gas category 1 or 2 certificate along with a current Level 3 Award in the Requirements for Electrical Installations BS7671:

8. **Units which a learner must have completed before the qualification will be awarded and any optional routes.**

Learners must complete the one mandatory unit before the qualification will be awarded. See Section 4.0 above.

9. **Other requirements which a learner must have satisfied before the learner will be assessed or before the qualification will be awarded.**

See Section 8.0 above.

10. **The design and delivery of the examination associated with these units are based on the following documents;**

ACRIB training specification for flammable refrigerants (Classification A2L, A2, & A3)

11. **The criteria against which learners' level of attainment will be measured.**

The Learning Outcomes and Assessment Criteria against which learners' level of attainment will be measured are detailed in Section 4 of this specification.

12. **Planned exemptions**

Note: Learners holding a valid (within 5 years of issue) certificate may RPL Learning Outcome 08. Be able to service and maintain RACHP systems.

13. **Specimen assessment materials.**

F-Gas Workbook 517/2014

14. Specified levels of attainment

Learners must achieve an overall pass in both the on-line and practical assessment for the qualification to be awarded.

15. Other information

SSAs: 4.1 Engineering

Review Date: Dec 26