

# REAL SKILLS EUROPE Training Course

## Design Requirements

### Scope

This document summarises the high level requirements for a REAL SKILLS EUROPE (RSE) Refrigerant Management and Leakage Reduction training course. It is aimed at RSE Project Partners, Stakeholders, trainers and national bodies that are responsible for Qualification development and Certification of training in the Refrigeration and Air Conditioning (RAC) sector. *It is a working document that will be reviewed and updated as necessary during the preparation of the course material and will be converted into a formal specification at point of release.*

### Consultation

The final design of the training scheme and the detailed content of the e-learning modules will take into account RSE project stakeholder feedback and comments on this document, together with the results of the web based RSE training survey. Stakeholders can provide feedback online (via the RSE stakeholder workspace at [www.realskillseurope.eu](http://www.realskillseurope.eu)) or by e-mailing comments to their project partners. Stakeholders will also be able to trial the pilot versions of the e-learning modules and provide feedback prior to final updates and public release.

### Contents

Scope .....	1
Consultation .....	1
1 General .....	2
1.1 Introduction .....	2
1.2 Course Aims and Objectives .....	3
1.3 Target Audience for RSE Training Course .....	3
1.4 Entry Requirements/ Pre-requisites .....	4
2 Learning Outcomes .....	4
2.1 Knowledge and Understanding .....	4
2.2 Intellectual Skills and Competencies.....	5
2.3 Practical Skills .....	5
2.4 Transferable Skills.....	5
3 Course Content, Teaching and Learning Strategy and Assessment.....	5
3.1 Course Content and Learning Materials.....	6
3.2 Teaching and Learning Strategy and Course Structure .....	6
3.3 Assessment .....	6
3.4 Feedback and Review .....	7
4 Course Accreditation, Certification and RSE Register .....	7
4.1 Course Accreditation and Certification .....	8
4.2 REAL SKILLS EUROPE Register .....	8
4.3 Maintenance/ Renewal of Registration.....	8
5 RSE Training Course Administration .....	8
5.1 Course Administration and Funding.....	8
5.2 RSE Training Course Fees .....	9
5.3 Deliverables .....	9
5.4 Copyright and Right to Use RSE Materials.....	10
Appendix 1 – RSE Course Content (Topics) .....	11
Appendix 2 – Marking Sheet for Module 4 Assessment .....	13
Appendix 3 - Checklist for Course Design/ CPD Accreditation.....	14

# 1 General

## 1.1 Introduction

REAL SKILLS EUROPE is a Leonardo da Vinci Transfer of Innovation (LdV TOI) project that is funded by the EU Lifelong Learning Programme and the 7 project partners (see [www.realskillseurope.eu](http://www.realskillseurope.eu) for further details). REALSKILLS EUROPE (RSE) stands for **R**efrigerant **E**missions **A**nd **L**eakage **S**kills for **E**urope: developing skills in refrigerant management and containment, to reduce leakage of refrigerant into the atmosphere. Most common refrigerants are Greenhouse Gases (GHGs) that have a Global Warming Potential (GWP) of more than 1000 times the GWP of Carbon Dioxide (CO<sub>2</sub>), when released into the atmosphere. A significant challenge for the Refrigeration and Air Conditioning (RAC) industry is to reduce the emissions from leakage of refrigerants, through effective refrigerant management and improvements in design, installation and maintenance practices.

The REAL SKILLS EUROPE (RSE) refrigerant management and leakage reduction training scheme will be an e-learning enhancement of the UK Institute of Refrigeration REAL Zero training scheme (see [www.realzero.org.uk](http://www.realzero.org.uk)), which includes 4 modules that are intended for self study over a period of 20 to 40 hours. The RSE training should be assessed on-line, with multiple choice questions and by submission of a site survey report that has been conducted by the student, in accordance with RSE methods and is marked by an independent assessor.

The RSE training should fit within the general RAC Vocational and Educational Training (VET) framework of the EU partner countries and pending EU Standard prEN 13313:2010 (Refrigerating systems and heat pumps — competence of personnel).

The scheme should not duplicate the mandatory training and certification that are required under the F Gas Regulations (EC 303/2008), except where it is necessary to expand on or to reinforce skills. RSE Training is expected to differ from F gas training in the following ways:

- F Gas training will help RAC technicians and craft-persons to identify and fix leaks, whereas RSE training should help them to prevent leaks from occurring
- RSE training builds on F Gas training (i.e. it is aimed at developing additional skills)
- RSE certified personnel are expected to be experienced and may hold additional RAC qualifications (there are no pre-requisites for F Gas training). They should be able to:
  - Analyse and diagnose problems using data collected on site and historical data from logbooks
  - Explain the Regulations and associated penalties for non-compliance
  - Analyse and explain the environmental and financial impact of refrigerant leakage to clients
  - Understand and influence changes to the servicing and maintenance regime that will help to reduce leaks
  - Understand and influence the design of new systems (and design changes to existing systems) in order to reduce leaks
  - Advise clients of any changes in Regulations and legislation
  - Undertake site surveys and prepare a comprehensive report for clients, including environmental and financial analysis of refrigerant leakage issues, identifying solutions and making recommendations for improvements, supported by a business case where appropriate

The RSE training course will comprise 4 modules:

1. Environmental, cost and legal aspects of refrigerant leakage
2. Reducing leakage through appropriate maintenance and service
3. Minimising leakage through good design
4. Reducing leakage through site specific surveys and advice

In order to achieve long term sustainability of the RSE project it must be capable of attracting sufficient revenue to cover the costs of maintaining, updating and administering the RSE website and training scheme. It is proposed that this will be achieved by making a charge for RSE training assessment and listing on the RSE Register.

## **1.2 Course Aims and Objectives**

- To raise levels of awareness of the environmental and financial impact of refrigerant leakage across EU member states
- To provide information, tools and training materials that will help the RAC sector to develop a common understanding of the impact of refrigerant leakage and how to reduce it
- To provide accessible training and practical skills that will be effective in containing refrigerant and mitigating GHG emissions from RAC systems, through the prevention of leaks
- To inform about best practice in the design, installation and maintenance of RAC equipment, for minimisation of refrigerant leakage
- To provide advice and training in methods for inspecting RAC systems, analysing refrigerant use data and identifying the potential for reducing refrigerant leakage
- To provide guidance on preparing RAC system survey reports that identify the financial and environmental impact of refrigerant leakage and include specific proposals and recommendations for reducing future leakage potential
- To encourage carbon emissions reporting in the RAC sector
- To provide an assessed and certificated qualification in refrigerant management and leakage prevention and reduction, that complements mandatory F Gas training and certification and is recognised and accredited between the RSE project partner countries

## **1.3 Target Audience for RSE Training Course**

The training course is aimed at refrigeration technicians, craftsmen, engineers and technical specialists who have practical on site experience of commercial and/ or industrial RAC systems and who would benefit from a more thorough understanding of the theoretical and practical aspects of proactive leak reduction than is covered within the EU and nationally accredited F-Gas and ODS refrigerant handling training schemes. The course could be of value to anyone working in the following areas:-

- RAC system design and manufacture
- RAC system installation and commissioning
- RAC system maintenance and repair
- RAC training
- RAC consultancy (e.g. services such as efficiency advice, drawing up specifications, managing tendering processes)
- Environmental management and carbon assessment

It is also aimed at influencing RAC system owners, operators and building facilities managers, who could benefit from undertaking study of certain elements of the course.

## **1.4 Entry Requirements/ Pre-requisites**

Anyone with an interest in RAC refrigerant management and leakage reduction should be able to access the training course material and undertake training and certificated on-line assessment for Modules 1-3.

Participants seeking full RSE certification will require prior certification in F Gas Refrigerant handling (EC 303/2008 Category 1), evidence of competence to prEN 13313:2010 (Refrigerating systems and heat pumps - competence of personnel) and will additionally be required to submit a written site survey report, which will be assessed by an independent RSE assessor (Module 4 assessment).

Participants should also be familiar with (or should study as part of the RSE training) the following:

1. ODS-Regulation EC 1005/2009 and R22 phase out.
2. Contents of F-Gas-Regulation EC 842/2006
3. Contents of Regulation EC 1516/2007 (leak testing requirements)
4. The key requirements of Regulation EC 303/2008 (certification and mutual recognition)
5. Refrigerating systems and heat pumps – safety and environmental requirements EN 378

## **2 Learning Outcomes**

The REAL SKILLS EUROPE training course content, delivery and assessment methods should be designed to impart knowledge and satisfy the key learning outcomes set out in the following paragraphs. It should avoid duplication of skills and knowledge required for F Gas certification (EC 303/2008 Category 1), except insofar as may be required to put the REAL SKILLS EUROPE training into context.

### **2.1 Knowledge and Understanding**

On successful completion of the course students will be able to:

- Explain the environmental and financial impact of refrigerant leakage and the importance of leak containment
- Explain the relevance of F-Gas and ODS Regulations and the related legal obligations of RAC system owners, operators and maintainers
- List RAC system registers, F-Gas logs and reporting requirements
- State GWP values of various refrigerants
- Discuss the principles of effective refrigerant management and the REAL SKILLS EUROPE methodology
- Describe why and where leaks occur;
- Identify the scale of refrigerant leakage;
- Describe how to audit compliance with F gas and ODS regulations.
- Describe RAC System maintenance concepts, best practice regimes and methods to minimize leakage
- Explain how to reduce leaks in existing RAC systems
- Select leak detection methods and equipment that are appropriate for the type of RAC system and refrigerant contained within it
- Explain RAC system design, installation and commissioning for minimum leakage
- Describe how to specify systems which have minimum leak potential;
- Explain the use of EN 378 to calculate design temperatures and pressures and the use of protection devices
- Describe the underlying procedures for effective surveys and audits

## **2.2 Intellectual Skills and Competencies**

On successful completion of the course students will be able to:

- Calculate the costs and financial benefits of a refrigerant leakage reduction programme.
- Estimate the carbon equivalent emissions and costs of refrigerant leakage (using the RSE calculator)
- Evaluate RAC systems for indications of leakage (indirect leak check)
- Propose how to prevent refrigerant leakage, identifying areas that pose a high risk of leak potential.
- Explain refrigeration system health checks and interpret and analyse the data
- Propose a maintenance specification and schedule for a system to minimise leakage.
- Describe and compare leak test procedures (including pressure testing) and how to improve the effectiveness of leak detection
- Assess appropriate application of REAL SKILLS EUROPE principles in specifying requirements for the design of new RAC systems (minimizing leakage potential)
- Specify installation procedures which minimise leakage;
- Specify commissioning procedures which minimise leakage.
- Compare the effectiveness of different types of fixed leak detection systems
- Appraise how a system may be improved to reduce leak risk.
- Assess leakage risks and the potential for leakage reduction (not just identifying leaks)
- Calculate the refrigerant charge in a system using a charge calculator and other methods
- Evaluate the effectiveness of site surveys and follow up actions to reduce leakage and contain refrigerant

## **2.3 Practical Skills**

On successful completion of the course students will be able to:

- Employ F Gas log data records to manage and analyse the use and containment of refrigerants
- Apply structured methodologies for leak detection and fault diagnosis.
- Demonstrate correct use, installation and positioning of refrigerant pipe work
- Illustrate the importance of using standards to aid the design process;
- Illustrate how to design pipe work with minimum leak potential;
- Undertake REAL SKILLS EUROPE site surveys, prepare reports and make recommendations to end users (based on a RSE standard format)
- Operate electronic leak detection devices.
- Collect and evaluate site survey data using the RSE site survey record sheet

## **2.4 Transferable Skills**

On successful completion of the course students will have developed their skills in:

- Report writing (REAL SKILLS EUROPE site survey reports for customers)
- Customer relationship skills (advising, recommending and influencing customers)

## **3 Course Content, Teaching and Learning Strategy and Assessment**

### **3.1 Course Content and Learning Materials**

The RSE training course will comprise 4 modules:

1. Environmental, cost and legal aspects of refrigerant leakage
2. Reducing leakage through appropriate maintenance and service
3. Minimising leakage – good practice for design, installation and commissioning
4. Reducing leakage through site specific surveys and advice

Core learning material should be developed for each module, to address the topics listed in Appendix 1 and should be mapped to the learning objectives to ensure full coverage. The learning material should be based on enhanced versions of the REAL Zero training modules. It may also refer to (or include content from) the RSE Guidance Notes.

Where practical, e-learning pages should include ‘rich’ content such as animations, video clips, links to other sources of information and self assessment questions.

The core learning material should include advice on how to make effective use of the RSE carbon emissions and cost calculator and F Gas logging tools, together with worked examples.

Other downloadable materials that should be made available to course participants include a site survey spreadsheet for recording data and observations while on site and a template that can be used to generate reports and recommendations to users, together with worked examples.

### **3.2 Teaching and Learning Strategy and Course Structure**

It is envisaged that the course will be made available for learning by on-line self study (e-learning), delivered at specialist RAC training centres, or both (flexible learning). Training modules will be accessed on-line and for consistency of approach it is envisaged that all course participants, whether undertaking self study or attending the course at a training centre, will be assessed using the same assessment methods.

The course should be structured to enable participants to perform self study over a period of time that suits both themselves and their employers, should they wish. Modules should therefore be split into separate manageable sections that can each be studied in periods of 20 to 30 minutes each, with regular opportunities for self assessment to check understanding and assimilation of the material. A progress bar should be visible and students should be able to resume study from the last section completed.

The RSE training should be assessed both on-line and by submission of a written site survey report that is marked by an independent assessor.

Although it is recommended that modules should be studied in sequence, they should also be accessible individually.

### **3.3 Assessment**

On completion of each module of the training course participants will be expected to undertake an assessment to demonstrate that they have acquired the necessary knowledge and skills to meet the learning outcomes listed in Section 2. The assessment questions should be mapped to the learning

outcomes in order to ensure that all areas are covered and to avoid unnecessary duplication of question types.

Modules 1-3 should be assessed on-line via a direct link from each e-learning module and the questions should include a degree of randomisation to ensure that participants cannot pass the test simply by continually re-taking the assessment. Access to the assessment routines should be controlled by the enrolling teacher/ administrator and may require an additional access code or password and be time limited (TBC).

A mix of question types should be included, such as multiple-choice, essay, computational and observational (e.g. watch a video and comment/ answer questions). Questions should be selected from a question bank (e.g. one question should be selected at random from 5 questions per topic/ learning outcome and presented to the student). The marking scheme should be automated and feedback of results to candidates should be provided immediately (feedback may include their score and any areas of weakness, but should not detail which questions were answered correctly or incorrectly). The pass mark should be 80% and the maximum number of attempts for each module assessment is 3.

Module 4 should be assessed through the submission of a written report of a leakage reduction site survey that has been conducted by the student in accordance with RSE methods and is marked by an independent assessor. Students seeking full RSE certification (which requires prior successful completion of Modules 1-3) will also be required to submit the following:

- a) Evidence of prior certification in F Gas Refrigerant handling that includes an assessment of practical skills (EC 303/2008 Category 1)
- b) Evidence of competence to EU Standard prEN 13313:2010 (Refrigerating systems and heat pumps - competence of personnel) or equivalent national standard
- c) A written refrigerant leakage reduction site survey report, which has been undertaken in accordance with RSE methods and formats and covers at least two large industrial or commercial RAC systems (cooling capacity >50kW). This report will be assessed by an independent RSE assessor in accordance with the criteria listed in Appendix 2

Students who achieve full RSE certification can apply for a listing as a refrigerant management and leakage reduction advisor on the RSE website

### **3.4 Feedback and Review**

The training course and assessment should be designed to allow participants to provide feedback at all stages and to highlight any concerns over the course content, material, duration or assessment.

The pilot test versions of the e-learning modules should include additional mandatory questions to seek feedback from the stakeholders/ students who are trialling the training course (the questions should be removed prior to public release of the e-learning modules).

The course must be administered to provide a timely response to any feedback received and should be reviewed at least annually and updated if necessary to ensure that it reflects any changes in legislation or other requirements.

## **4 Course Accreditation, Certification and RSE Register**

## **4.1 Course Accreditation and Certification**

A key objective of the RSE training course is that the materials (content) and the delivery and assessment methods should be accredited by organisations that are responsible for developing and certifying national and regional qualifications in the RSE project partner countries. Successful completion and assessment of each module should lead to the award of a certificate that is recognised in other partner countries. Successful completion of all 4 modules should permit the individual to apply for a listing on the REAL SKILLS EUROPE Register of Leakage Reduction advisors.

## **4.2 REAL SKILLS EUROPE Register**

The REAL SKILLS EUROPE Refrigerant Management and Leakage Reduction advisor register will provide an on-line listing of individuals (and their company affiliation if they wish), who can offer specialist guidance and advice on refrigerant management and leakage reduction, using RSE methods and tools.

In order to be listed on the register, RAC technical specialists will have to meet the following requirements:

- Achieve basic REAL SKILLS EUROPE Refrigerant Management and Leakage Reduction certification by successfully completing the training and on-line assessment (Modules 1-3)
- Achieve enhanced REAL SKILLS EUROPE Refrigerant Management and Leakage Reduction certification by:
  - Providing evidence of Certification to F-Gas Regulation EC 303/2008 Category 1 (leak checking, recovery, installation, service and maintenance of equipment)
  - Providing evidence of competence to EU Standard prEN 13313:2010 (Refrigerating systems and heat pumps - competence of personnel) or equivalent national standard
  - Obtaining a pass mark for an assessed written refrigerant leakage reduction site survey report, which has been undertaken in accordance with RSE methods and formats (see Section 4.2 for further details)
- Payment of a registration fee

RSE advisors will be expected to maintain a summary record of RSE surveys that they perform, including key findings, potential carbon savings, recommendations made to clients and any follow up activities undertaken by the client or advisor.

## **4.3 Maintenance/ Renewal of Registration**

The listing of each Refrigerant Management and Leakage Reduction advisor will be reviewed every 5 years. Registrants seeking renewal will be required to pay a renewal fee and submit their summary record of RSE surveys undertaken since last renewal or registration. The records will be checked by an independent RSE assessor, who shall either confirm renewal or request further information about surveys undertaken.

# **5 RSE Training Course Administration**

## **5.1 Course Administration and Funding**

The training course and assessment should be accessed via the RSE website and hosted on the e-learning server. There should be a single point of registration for students onto the e-learning platform (by administrators on behalf of the students). Prospective students could use the 'contact us' form in

their preferred language to make contact with the relevant RSE project partner to start the registration process.

Administration of the scheme should be managed in each partner country. Each partner organisation should enrol their own students onto the e-learning platform (as Teachers) and issue the passwords and certificates for their students. They should also be responsible for collecting student fees and making an agreed contribution for each student into the RSE Core Funding Account (a funding scheme set up by the partners to cover the core costs of sustaining the RSE project beyond Sep 2011).

The cost of sustaining the REAL SKILLS EUROPE project after the EU funding ends is expected to include the following elements:-

- a) RSE project partners will incur costs for hosting and maintaining the e-learning and RSE websites. Each partner country will be expected to maintain their own RSE stakeholder workspace and carry out translations of any updates. They will also be expected to undertake translations of any new materials on the e-learning website (including any changes to the assessment questions).
- b) Each partner will incur costs for administering the training scheme in their own country. Activities will include registration of students, managing payments (from the student and to the RSE Core Funding Account), enrolling students on the e-learning website, managing online results and the Module 4 assessment process, maintaining records and issuing certificates.
- c) Partners may incur other costs for promotion and in relation to overhead activities associated with administering the training scheme

It is proposed that the core costs of sustaining the RSE project should be funded by a RSE Core Funding Account. This account should receive a fixed contribution for each student enrolled on the training scheme (collected and paid into the account by the enrolling Partner) and share the revenues between partners according to a formula agreed by them.

## **5.2 RSE Training Course Fees**

In order to make the course widely accessible the RSE project partners propose to keep the cost low. For a course that is entirely e-learning and assessed automatically on-line, the target cost to students is €100 (RSE training course base fee). For a course that is delivered and assessed at a training centre, the fee charged to students may be determined by the training centre, but the centre will be required to contribute the agreed RSE training course base fee to the RSE Training Account (for each student).

## **5.3 Deliverables**

The REAL SKILLS EUROPE Refrigerant Management and Leakage Reduction Skills training and assessment material should be suitable for on-line delivery (e-learning) or downloadable via access to a protected website and should comply with the CPD requirements outlined in Appendix 3 (Course Design/ CPD Checklist). NOTE: this is a generic checklist that covers the course delivery method as well as the training and assessment materials.

The following training materials should be provided as editable soft copy:-

- A summary training and assessment guide for use by trainers and assessors
- A student course guide (details of training content, modules and assessment)
- Photographs, diagrams and video clips used within the training modules

- A set of TBD questions, from which the assessment questions can be randomised and adapted over time
- A document that maps e-learning module content and assessment questions to learning outcomes
- A process and schedule for periodic review of the training and assessment material and delivery method, to verify that they meet the requirements and support skills development to the required level
- A document that details the administration processes

#### **5.4 Copyright and Right to Use RSE Materials**

The Intellectual Property Rights (IPR) and copyright of all new material developed for the REAL SKILLS EUROPE Refrigerant Management and Leakage Reduction Skills training course shall vest with the RSE project lead partner (IOR). All partners shall have unrestricted right to use the RSE training materials, subject to any limitations or obligations arising from ownership of materials, IPR or copyright by third parties.

Permission shall be obtained before using any material or data owned by a third party and the source of such material or data must be acknowledged within the course material.

## Appendix 1 – RSE Course Content (Topics)

Category	Topic
<b>General</b>	<ul style="list-style-type: none"> <li>The aims and objectives of refrigerant leakage reduction programmes</li> </ul>
<b>Legal Obligations</b>	<ul style="list-style-type: none"> <li>The legal obligations of the business and its employees under the F Gas and ODS regulations</li> <li>How to audit compliance with F Gas and ODS Regulations Overview of refrigerant handling qualifications</li> </ul>
<b>Environmental and Cost Impact</b>	<ul style="list-style-type: none"> <li>Calculating the CO2 equivalent emissions from refrigerant leakage</li> <li>Calculating the costs and financial benefits of a refrigerant leakage reduction programme</li> <li>Making the business case for reducing leakage</li> <li>Making the environmental case for reducing leakage</li> </ul>
<b>Refrigerant Management</b>	<ul style="list-style-type: none"> <li>How to develop a proactive (instead of reactive) approach to refrigerant management</li> <li>How to be proactive in reducing leaks</li> <li>Site surveys and leakage risk reports and recommendations</li> </ul>
<b>System Maintenance, Contracts and Documentation</b>	<ul style="list-style-type: none"> <li>Best practice methods for service and maintenance System maintenance regimes, contracts and best practice</li> <li>How to prepare, maintain and make effective use of site records and F Gas logs to reduce leaks</li> <li>How to compile and register a site equipment inventory</li> <li>Labelling of refrigeration equipment - legal obligations</li> </ul>
<b>Site Surveys and Audits</b>	<ul style="list-style-type: none"> <li>How to carry out site audits, prepare leakage risk reports and make recommendations to owners</li> <li>Site audit follow up - verifying the impact of changes</li> </ul>
<b>Refrigeration System Health Checks</b>	<ul style="list-style-type: none"> <li>Using historical site F Gas log data to carry out audits</li> <li>Determining whether an RAC system is meeting its performance objectives</li> <li>Calculating the system charge and understanding the consequences of incorrect refrigerant charge</li> <li>Verifying efficient system operation and performance</li> </ul>
<b>Refrigerant Leakage Testing</b>	<ul style="list-style-type: none"> <li>Refrigerant leakage inspection methodology and frequency of checks</li> <li>What to look for when inspecting older equipment Common leak points</li> <li>Refrigerant leakage test procedures (direct method)</li> <li>Refrigerant leakage test procedures (indirect method)</li> </ul>
<b>Portable and Fixed Leak Detectors</b>	<ul style="list-style-type: none"> <li>The selection, use, calibration and maintenance of portable leak detectors</li> <li>The advantages and disadvantages of different leak detection methods and when to use indirect leak testing</li> <li>The use of fixed leak detection systems</li> <li>Options for installation and verification of fixed leak detection systems</li> </ul>
<b>Leak Reporting, Repair and Reduction</b>	<ul style="list-style-type: none"> <li>Reporting and repairing leaks, retesting after repair</li> <li>Reducing refrigerant leaks in existing equipment</li> </ul>

Category	Topic
Designing New Equipment	<ul style="list-style-type: none"> <li>• How to specify new equipment to minimise potential for leakage</li> <li>• Designing out refrigerant leaks in specifications for new equipment</li> <li>• Installation and commissioning</li> </ul>
Process Quality	<ul style="list-style-type: none"> <li>• Quality assurance and audit</li> </ul>
Additional Topics (proposed by RSE Stakeholders during consultation)	<ul style="list-style-type: none"> <li>• Glossary and terminology</li> <li>• Cooling load calculations (Note; the value of this has been questioned by another reviewer)</li> <li>• Prioritising actions: identifying equipment with the highest leakage risk</li> <li>• Early detection of refrigerant loss</li> <li>• Minimum pressure test and commissioning periods</li> <li>• Correct installation and use of fixed leak detectors</li> <li>• EN378 (sections relating to leakage &amp; system design – design and test pressures, tightness testing procedures, design for safety devices, piping of relief devices)</li> <li>• Leak detection by wrapping components (Ecole des Mines)</li> </ul>

Highlights: Topics listed in the RSE web based training survey  
New topics proposed by Stakeholders during the consultation process

*Note: This list of topics is intended to be used as a working document by those responsible for preparing training and assessment modules and should be reviewed and updated as necessary during the preparation of material.*

## Appendix 2 – Marking Sheet for Module 4 Assessment

The following marking sheet should be used when assessing site survey reports from engineers who are applying to be entered onto the register of leak reduction specialists.

Topic	Criteria	OK?	Comments/ Marks (10 per topic)
Format	Is the report in the RSE specified format? Is the report easy to read and understand?		
Basic information	Does the report include the basic information required by RSE?		
Exec summary	Does the exec summary provide the key information, main issues, main recommendations and equivalent environmental impact?		
Survey	Did the survey include: Visual check Leak test F Gas log check Discussions		
Survey report	Is the survey report (Excel workbook) included?		
Design and installation issues	Are these included and clear if relevant?		
S & M issues	Are these included and clear if relevant?		
F Gas compliance	Is the information included and accurate?		
Recommended strategy	Is it appropriate? Is it clear? Is it practical? Is sufficient information included?		
What to do next	Is this included? Is it clear? Is it helpful?		
Overall Mark	Pass/ Fail (80% pass mark)		

### Appendix 3 - Checklist for Course Design/ CPD Accreditation

Ref	Parameter	Method of Demonstrating Compliance
1	Is the title unambiguous and clear?	
2	Is the subject matter clearly defined and compatible with the title?	
3	Are the learning objectives clearly defined?	
4	Is the target audience(s) clearly defined?	
5	Is the subject matter topical and relevant to the further learning requirements of the audience?	
6	Is the projected learning benefit adequately addressed?	
7	Are the technical aspects supported by independent reference points?	
8	Are all of the relevant codes of practice, regulations, standards, etc., given?	
9	Where relevant, are environmental issues sufficiently taken into account and addressed?	
10	Is reference to the member's own products restricted and applied only in the context of generic learning?	
11	If slides/OHP/computer generated visuals are used as part of a seminar, are they relevant and do they enhance the information provided, not just display the member's products?	
12	Is the quality of illustrative material likely to be of a sufficient standard to meet the expectations of the projected audience?	
13	If a seminar, site or factory visit – is audience participation encouraged where possible, and is this made clear?	
14	Is an approximate study time defined for CPD purposes?	
15	Does the CPD content meet that allocation?	
16	Is the material clear, unambiguous and complete?	
17	Are further study/action plans suggested?	
18	Is supporting technical and product documentation available?	
19	Is there a mechanism for feedback from the users, i.e. an evaluation report sheet?	
20	Does the course provider identify opportunities for further learning and/or additional CPD material which they have or intend to have made available, or which can be obtained from elsewhere?	

*(Note: This checklist should be completed when reviewing course material to ensure that it meets the required standards for CPD accreditation. The authority for review should be as delegated by the REAL SKILLS EUROPE Project Partners)*