Real Alternatives for LIFE
Refrigerant Emissions Alternatives and Leakage – FREE blended learning for low GWP refrigerants
Marco Buoni

VicePresident International Affairs
Air conditioning Refrigeration European Association AREA www.area-eur.be
Secretary General Associazione dei Tecnici del Freddo - ATF
wwwassociazioneATF.org
Technical Director Centro Studi Galileo - CSG www.centrogalileo.it
Skype: marcobuoni
Email: buoni@centrogalileo.it
Second Phase of the Real Alternatives project started in 2014-16

Objectives

1. Increase knowledge amongst technicians in partner and stakeholder countries.
2. Address inconsistencies in skills across the whole of the EU
3. Overcome equipment operator and distributor concerns over safety, reliability, containment, efficiency and standards restrictions
4. Support implementation of F Gas Regs and transition to low GWP alternatives
   - Project start date 15th June 2017
   - Project end date 14th June 2020
Essential information about REAL Alternatives 4 LIFE

- Project co-ordinator - IOR (UK)
- Management Team – includes original REAL Alternatives project (2016)
- Stakeholders group of seven new organisations
- 13 languages for the final outputs
- 9 Modules (8 existing ones revised plus 1 new)
- Train the Trainer resources, Licences and Certification
- Study visits (4 in training centres eg Belgium, Germany, UK, Poland, Italy)
- Train the Trainer events (5 in stakeholder locations – 20 people at each)
- Project presence at conferences, trade shows and exhibition, international governmental meetings, policy makers
- Generating regular articles/newsletters/social media
- Together we have the potential to reach 228,000 employers, 26,000 RACHP installation businesses and 100 suppliers across Europe and internationally
Learners (the numbers)

• Around 5000 persons (mainly contractors) are using it already
• Already available in the following languages: English, Dutch, Finnish, French, German, Italian, Polish, Russian, Spanish,
• Soon in Croatian, Czech, Rumanian, Slovak, Turkish
• We had expression of interest for translation by Estonia, Portugal but still no final agreement, we’re open to new ones.
Project Management team and consortium
8 independent institutes, associations and organisations

Associazione Tecnici del Freddo, Italy
Institute of Refrigeration, UK
London South Bank University, UK
European Association for Refrigeration, Air Conditioning and Heat Pumps (AREA)
Informationszentrum für Kälte-Klima- und Energietechnik, Germany
Limburg Catholic University College, Belgium

With the co-operation of the International Institute of Refrigeration
Project activity will include additional stakeholders representing extra languages

- **SOSIAD**
  - Turkish RAC industry association

- **HORKT**
  - Croatian RACHP association

- **Cni**
  - National Confederation of installers, Spain

- **AGFR**
  - Romanian General Association of Refrigeration

- **SZ CHKT**
  - Slovakian RAC technical group

- **CHKT**
  - Czech RAC technical group
Project stages

1. Survey on training awareness and needs in your countries – Sept/Oct 17

2. Prepare new material on risk and safety for flammables – Sept 17

3. Review existing learning modules in line with market needs findings – July/Sept 17

4. Raise awareness of the project with press releases, articles, talks

OUTCOMES

Report on EU training needs

Updated e-learning modules and booklets

Training the trainers programme: standard lessons plans, practical tests, trainer training events, certification for trainers and technicians
5. Translate all materials Apr/Dec2018 and launch in Europe

6. Run Study days at existing training facilities Sept/Dec 2018

7. Run Train the Trainer events in stakeholder countries March/June 2019

8. Promote take up within EU through extensive communications and extend outside of EU in 2020

Launch elearning and training programmes by end of 2018

Promote the programme and certification across Europe, encouraging attendance at courses

Add more EU and non EU partners before and after the end of the project
Materials to support the delivery of training courses

Available from June 2018

• Course content— theory and practical
• Theory assessments (multiple choice test papers)
• Practical assessments
• Certification of individual learners
• Requirements of training facilities to delivery REAL Alternatives courses
• Competence of trainers – experience and knowledge
• Practical equipment requirements for training centers
• Test equipment specifications (design of test rigs)
• Video demonstrations
# REAL Alternative Learning Modules

**9 booklets to download for free as study aids and e-learning**

<table>
<thead>
<tr>
<th>Programme Modules now available at <a href="http://www.realalternatives.eu">www.realalternatives.eu</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to Alternative Refrigerants - safety, efficiency, reliability and good practice</td>
</tr>
<tr>
<td>2. Safety and Risk Management</td>
</tr>
<tr>
<td>3. System design using alternative refrigerants</td>
</tr>
<tr>
<td>4. Containment and leak detection of alternative refrigerants</td>
</tr>
<tr>
<td>5. Maintenance and repair of alternative refrigerant systems</td>
</tr>
<tr>
<td>6. Retrofitting with low GWP refrigerants</td>
</tr>
<tr>
<td>7. Checklist of legal obligations when working with alternative refrigerants</td>
</tr>
<tr>
<td>8. Measuring the financial and environmental impact of leakage</td>
</tr>
<tr>
<td>9. Tools and guidance for conducting site surveys</td>
</tr>
</tbody>
</table>
Introduction to Alternative Refrigerants

Contents
1. Introduction
2. R744 (carbon dioxide, CO₂)
3. R717 (ammonia, NH₃)
4. R32 (HFC)
5. R1234ze and R1234yf (HFO)
6. R290, R1270 and R600a
7. Safety
8. Restrictions on use
9. Performance and operating conditions
10. Environmental impact
11. Availability
12. Leakage issues
13. Relevant standards and legislation

Elearning and booklets

Introduction to Module 1

This e-learning Module (no 1 of 8) gives an introduction to currently available alternatives to high GWP refrigerants.

Once you have completed Module 1 you will be able to access all of the remaining e-learning Modules.

Aim of Module 1

In this Module we will provide a general introduction to the different alternatives to high global warming potential (GWP) hydro fluoro carbon (HFC) refrigerants and compare their properties, performance, safety issues, environmental impact and ease of use. These refrigerants are used in new, specially designed systems - they are rarely suitable to replace refrigerants in existing systems.

The main alternatives have low to zero GWP, but it is important that a refrigerant is not selected on the basis of low GWP alone; other characteristics should be taken into account such as:
- Operating pressures
- Performance - capacity and efficiency
- Material compatibility, including compressor lubricant
- Safety, including flammability and toxicity
- Temperature glide
- Ease of use and skill level of design engineers and technicians who install, service and maintain equipment.

This is useful reference material for anyone working in the refrigeration, air conditioning and heat pump (RACHP) industry. It assumes you already have knowledge of RACHP systems which use HFC refrigerants.

Extra Information about Standards

To avoid copyright infringement no part of International, European or National standards has been included.
### LET’S MOVE TO ALTERNATIVE REFRIGERANTS TOGETHER!  
(options to cooperate with Real Alternatives)

<table>
<thead>
<tr>
<th>Option</th>
<th>Global Partner</th>
<th>National Lead Partner</th>
<th>Training Partner</th>
<th>Assessing Partner</th>
<th>Sponsor Partner</th>
<th>Free User</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>Institutions, Associations, Government representatives</td>
<td>Training Centres, Associations, Certifying Bodies, Institutions</td>
<td>Companies, Training Centres, Associations, Institutions</td>
<td>Training Centres, Associations, Certifying Bodies, Institutions</td>
<td>Businesses in the HVAC/R&amp;HP sector</td>
<td>Training Centres, Associations, Certifying Bodies, Institutions, Companies</td>
</tr>
<tr>
<td>WHAT</td>
<td>Translate the training into national language* and be official representative for your Country</td>
<td>Be the official REAL Alternatives© representative for your Country</td>
<td>Licence trainers to deliver theoretical &amp; practical training in your Country</td>
<td>Can carry out Assessments and issue Certificates to technicians***</td>
<td>Have your Company’s logo displayed on websites and newsletters</td>
<td>Disseminate Real Alternatives© free online material and e-learning platform within your network</td>
</tr>
<tr>
<td>WHY</td>
<td>Spread knowledge globally, improve consistency of training standards and support training in your Country</td>
<td>Become REAL Alternatives reference point for your Country**, help to implement national legislation, standards, etc.</td>
<td>To ensure consistent standard of technician training using REAL Alternatives© programme materials</td>
<td>Use ready-made REAL Alternatives© assessment and certification standards</td>
<td>Connect with thousands of businesses worldwide and show your active participation</td>
<td>Share the innovative and free online platform of Real Alternatives© to enrich the culture and knowledge on new alternatives</td>
</tr>
<tr>
<td>HOW LONG</td>
<td>unlimited</td>
<td>unlimited</td>
<td>3 years</td>
<td>3 years</td>
<td>3 year</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

*Already available languages: English, Italian, French, German, Polish, Spanish, Finnish, Dutch; under development languages: Russian, Portuguese, Czech, Slovakian, Romanian, Croatian, Turkish  
**Possible only when training material is already available in the official language of your Country  
*** Certificate fee: 30€
Training and Certification on Alternative Refrigerants by independent bodies

Modules on the different Alternative and Natural Refrigerants through the Real Alternatives Certification

- Carbon dioxide
- Ammonia
- Hydrocarbon
- HFO and mixtures

Addressing safety, efficiency, reliability and containment aspects of service and maintenance.

- Higher system pressures
- Flammability
- Toxicity

And the tools to handle those refrigerants

REAL Alternatives for LIFE
Cooperation with UNEP

**Refrigerant Driving License (RDL)**
- Initiated by UNEP and AHRI
- Participation of ASHRAE, JRAIA, AREA, EPEE, ABRAVA, UNIDO and GRME
- Currently at Stage-I Assessment, Pilot phase starts end of 2016

**Streamlining Training for RSS**
- Joint approach for assessing global training programs for RSS
- Includes participation of IAs and RAC associations
- First Stakeholders workshop in April 2016
- Target is to have global Roadmap for RSS training

**Specialized Training Program for Future Alternatives**
- Cooperation with AREA
- Benefiting of REAL program
- Specialized training packages on future alternative refrigerants
- Programs offered to training institutes in A5 countries

Universal Training Kit for Alternative Refrigerants
- Venue requirements, Tests, Syllabus, Powerpoint presentation, several modules based on Real Alternatives project, UNEP, AREA experience and material
Thank you!

www.realalternatives4life.eu

Marco Buoni
Skype: marcobuoni
Email: buoni@centrogalileo.it

REAL Alternatives
@REAL_Arts_EU
European project to develop blended learning resources for alternative refrigerants covering carbon dioxide, hydrocarbon, ammonia and HFOs

REAL Alternatives for LIFE