



The Voice of European Air-Conditioning, Refrigeration and Heat Pumps Contractors

POSITION PAPER

Brussels, 29th November 2011

RE: RES Directive – certification or equivalent qualification schemes for installers of heat pumps

AREA (www.area-eur.be) is the European organisation of air-conditioning, refrigeration and heat pumps contractors. Established in 1988, AREA voices the interests of 19 national members from 16 European countries, representing more than 9,000 companies across Europe (mainly small to medium sized enterprises), employing some 125,000 people and with an annual turnover approaching € 20 billion.

1 AIM

To set requirements for achieving certification or equivalent qualification schemes with regard to the Renewable Energy Sources (RES) Directive 2009/28/EC (RES) Article 14 paragraph 3, for design, installation, service and maintenance of heat pumps.

By doing so, assist the EC and Member States in ensuring the successful transition into national schemes by 2012 of those aspects of, RES relating to heat pumps.

2 BACKGROUND

RES Article 14, paragraph 3, requires every Member State to introduce certification or equivalent qualification schemes by 31 December 2012 for installers of small RES systems including heat pumps.

Heat pumps operate using the thermodynamics of the refrigeration cycle. They efficiently employ renewable energy and a small amount of auxiliary energy to provide heating, cooling and hot water. These benefits will not materialise in most cases unless the design, installation, servicing, maintenance and commissioning are executed by persons trained and competent not only in Refrigeration, Air Conditioning and Heat Pump (RACHP) technology, but also in plumbing, ventilation and energy efficiency technologies.

2.1 Use of renewable energy

The RES Directive aims at maximising the use of renewable energy sources. For heat pumps, this results in a minimum seasonal performance of 2.63, based on the average efficiency of EU electricity production of 43.8% as published by Eurostat ($SPF > 1/\eta * 1.15$). For all heat pumps that meet these criteria, the calculation of renewables contribution is based on final energy. If an electric heat pump provides 10,000 kWh of heat per year and operates with an efficiency of 4, this means 7,500 kWh are used from ambient energy whereas 2,500 kWh are electric.

2.2 Environmental impact

While the RES Directive does not explicitly address the environmental impact of heat pump operation¹, it acknowledges the need for proper installation to achieve an efficient and reliable system. This results in:

- a) lower energy demand
- b) low leakage of refrigerants during operation and during handling of heat pump units at the end of their useful life.

These aspects are addressed in other pieces of legislation: the F-Gas Regulation governs the handling of fluorinated refrigerants, especially the need for certified installers, while the Energy related products Directive focuses on more energy-efficient products.

The RES Directive takes a more general approach, asking Member States to establish systems of certification for all installers of renewable energy systems. This can include the handling of fluorinated gases, but is in general broader in scope including all aspects of marketing, sales, installation, maintenance and dismantling of a unit. It is also vital to understand and take full advantage of fully utilise the environmental impact of synthetic and natural refrigerants, as well as that of other products and components such as secondary refrigerants, oils etc.

3 QUALIFICATIONS

3.1 General requirements

All certification systems shall be based on a check of theoretical and practical knowledge. This is similar to the approach taken in certification of F-Gas installers (requirements set in 846/2006 and 303/2008).

Requirements shall follow the matrix structure outlined in the standard EN 13313 - Refrigerating systems and heat pumps – Competence of personnel.

In addition, requirements stipulated in Annex 4 of the RES Directive must also be fulfilled.

3.2 Legal requirements

3.2.1 Existing legislation – F-Gas Regulation

The European legislation (EC) No 842/2006 governs the training, qualification and certification of individuals and the registration of companies able to work on RACHP systems containing HFC refrigerants.

Any certification or qualification scheme with regard to the RES Directive must therefore match and be subordinate to those of the F Gas Regulation in order to avoid duplicate or divergent legislation. This is extremely important as the majority of HP installations, which require breaking into the refrigerant circuit, need to be completed by competent RACHP tradesmen already covered by the F Gas Regulation.

AREA supports and promotes this legislation to encourage the highest standards of professionalism amongst RACHP contractors in order to match the obligations of the regulation. It is entirely inconsistent with environmental objectives for AREA to recommend anything other than complete compliance with the F Gas Regulation as the absolute minimum requirement for anyone to work on an HP system, except for the most basic of products.

¹ One must however point out that following the ErP and RES Directives a heat pump COP of 2.87 or above is required to qualify as a renewable heat source

3.2.2 Existing legislation – non F-Gas

For the same reasons, the RES Directive must also be subordinate to legislation covering personal and mechanical safety such as the PED, Machinery Directive, EMC Directive and others. Therefore, with regard to qualification schemes, the RES Directive will be ranked lower than all other legislation in this sector.

3.3 Specific requirements

The individual shall to the extent possible show that he has sufficient knowledge, both theoretical (T) and practical (P), within the below-mentioned areas of heat pump systems, energy efficiency and environmental impact. All competence acquired shall reflect and be in line with best practices and valid health and safety regulations.

Personal qualification shall be proven via examination as specified under clause 3.1 above.

3.3.1 Heat pump system design

- Understand the relation between production – distribution – usage. (T)
- Have general knowledge of various design philosophies, their field of application and specific efficiencies. (T)
- Understand the expression, meaning and differences between different heat sinks and heat sources. (T)
 - Heat sources
 - o Soil
 - o Ground water
 - o Air
 - o Sun
 - o Combinations of above
 - Heat sinks
 - o Radiator system
 - o Floor heating system
 - o Air
 - o Domestic Hot Water
 - o Combinations of above
- Be able to determine planning and installation of a full HP system. (T)
- Have general knowledge of secondary and auxiliary systems. (T/P)
 - Energy distribution and hydronic system integration
 - Air-handling
 - Cooling
 - Heating
 - Electricity, electro- and controlling techniques
- Possess knowledge of maintenance, service, trouble-shooting and operation of a heat pump system including its impact on the performance of a system. (T/P)
 - Maintaining a heat pump system
 - Fault diagnostics, frequent mistakes and practical experiences
 - Service interval for critical components

- Applying of meters and gauges
- Measuring
- Analysis
- Correction and optimization
- Commissioning

3.3.2 *Energy efficiency*

- Available refrigerants and their technical, environmental and financial impact. (T)
- Definitions and recommended values for: (T)
 - COP – Coefficient of Performance
 - SPF – Seasonal Performance Factor
 - TEWI – Total Equivalent Warming Impact
 - Refrigerant charge vs. heating capacity
- Energy consumption and cost aspects of energy efficiency on heat pumps. (T)
 - Component selection and cost calculation of heat pump systems
 - Applying and understanding different performance parameters as specified above.
 - LCC system calculations and evaluation of alternatives.
 - Comparison with other alternatives such as district heating, local gas/oil burners or direct electricity heating.

3.3.3 *Environmental impact*

- Available refrigerants and their technical, environmental and financial impact (T)
- Energy consumption and cost aspects of energy efficiency on heat pumps including interpretation and consequences of variations in the following parameters. (T)
 - COP – Coefficient of Performance
 - Temperature difference between condensing/evaporating and liquid
 - SPF – Seasonal Performance Factor
 - TEWI – Total Equivalent Warming Impact
- Available secondary refrigerants and their technical, environmental and financial impact. (T)

4 OBTAINING AND RENEWING OF CERTIFICATION

4.1 *Obtaining of certificate*

In order to obtain a certificate, documented competence and experience shall be verified through a theoretical and practical test similar to that of the F-Gas requirements included in 846/2006 and 303/2008.

Personal qualification shall be proven via examination as specified under clause 3.1 above.

The certificate will be issued by a national certifying body with a recommended validity of 5 years.

4.2 Renewing of certificate

In order to renew the personal certificate, the same test procedures as those stipulated under provision 4.1 shall be applied.

In addition to test procedures, the individual shall provide:

- Evidence of a minimum number of TEN installations or service operations realised during the period of validity.
- Proof of having undergone further professional training through short “update” sessions.

The certificate will be issued by a national certifying body with a recommended validity of an additional 5 years.

5 CONCLUSIONS AND RECOMMENDATIONS

- Coordinated and synchronised implementation of training and certification schemes applicable to RACHP contractors must be ensured to avoid duplicate or divergent requirements (F-Gas, EPBD and RES).
- Governments shall make sure that a modular approach is taken to allow proper education and certification to ensure quality installation according to the needs of the different markets. RES Certification systems should in particular be aligned with
 - existing legislation for F-Gas certification
 - existing legislation for non F-Gas certification.
- An alignment of systems will result in the most efficient certification system avoiding unnecessary administrative burdens and cost.
- AREA welcomes the documented requirement to verify competence via a theoretical and a practical test, as both are necessary to be able to perform proper installations.
- AREA recommends that statistics be collected from successfully certified companies giving information on:
 - Number of installed heat pump units
 - Installed heating capacity
 - Type of installations (soil, ground water, air)
 - Installed type and charge of refrigerant

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