EU minimum requirements

on

Training and certification for personnel and companies

involved in installation, maintenance, inspection and repair of refrigeration, air conditioning and heat-pump systems and equipment

Guidelines and recommendations for EU Refrigeration, Air Conditioning & Heat Pump Contractors and System Operators

proposed by

Air conditioning and Refrigeration European Association*

*AREA is the European Federation of National Refrigeration and Air Conditioning Associations. Established in 1988, AREA represents the industry of refrigeration, air conditioning and heat pump installation (design, assembly, commissioning, maintenance, service, repair, dismantling), in particular at the level of the European Institutions.
Today AREA comprises national associations from the following countries : Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany (2), Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Slovakia, Spain, Sweden, Turkey and United Kingdom (2).

Introduction

The present position, as guidelines and recommendations, refers to the minimum requirements and conditions for mutual recognition fundamentally specified in the Article 5 (1) – Training programmes and certification for personnel and companies – of the **Regulation 842/2006/EC** of the European Parliament and of the Council on certain fluorinated greenhouse gases

The main general requirements have been stated such terms that it would be possible to extend them for use with other types of refrigerant.

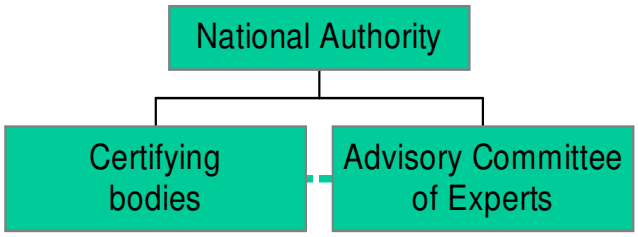
Member States shall check the appropriateness and the completeness of their national legislative instruments with regard to the relevant EU Regulations, Directives and Standards, and take the necessary legal and executive acts to establish or adapt their programmes accordingly.

They shall appoint, specify or confirm the relevant organizations and institutions that will be in charge at the different levels and determine the range of their tasks, procedures and responsibilities.

An efficient and thorough dissemination of information to all stakeholders should be organized.

Requirements concerning Personnel and Companies

1. Recommended general structure



The National Authority is the governmental institution, for instance a Ministry or a National Agency, responsible for controlling the implementation of the overall scheme.

The scheme includes a Certifying Body or Certifying Bodies[1] carrying out the functions of assessment and certification / registration of personnel and companies' working procedures and structure : the National Authority has to recognize the competence of such a Body or such Bodies in accordance with standards EN 45012 and EN 45013 / ISO 17024.

The Certification Bodies must have experience within the refrigeration sector and employ subject competent specialists in refrigeration and air conditioning.

The Advisory Committee of Experts assists the National Authority in its controlling mission and serves as a counsellor to define and update – when needed – the criteria for certification (e.g. demands and terms of examinations, structures and terms of inspections, …). The members of the Advisory Committee are experienced

[1] "Certifying body" may have different meanings in different Member States. The UK wishes to make clear that registration is the recording system based upon certified qualifications.

representatives of the government, refrigeration vocational education bodies / schools, certifying bodies and relevant trade associations (industry and end users).

2. Requirements for the Certification of Personnel

Persons, who are responsible for installation, commissioning, inspection, testing, operation, maintenance, repair and de-commissioning of refrigerating systems and their parts shall have the necessary training and knowledge for their task to achieve competence. Competence in each task shall be required for health, safety, environmental protection and energy conservation purposes.
The normative references are the standards EN 378-1/2/3/4 and EN 13313.

The objective of the Regulation is to contain, prevent and thereby reduce emissions of the fluorinated greenhouse gases covered by the Kyoto Protocol.

For this purpose, it is recommended that there are two categories of certified personnel that shall

- have a different scope of authorized activities under the certification criteria;
- have the same level of competence to inspect, analyze relevant data and parameters, make the correct diagnosis, identify abnormal functioning and/or leakage and use all measures specified in the Regulation to prevent leakage and have, as soon as possible, any detected leakage repaired.

The first category represents the **Maintenance Technician, "MT".**
The second category represents the **Refrigeration Craftsman, "RC".**

It is essential to state that the Maintenance Technician (MT) is not authorized to break into the refrigerant circuit. Only a Refrigeration Craftsman (RC) is.

As an example, an MT is not permitted to fit a set of gauges to a refrigeration system; if an MT needs to read pressures, etc, the "operator" should have permanent gauges connected to the system by an RC.
Any access to the refrigerant must be considered breaking into the circuit.

2.1 Maintenance Technician

The MT is employed by the operator (operator as defined in Article 2 – item 6 of the Regulation) of a refrigeration system and is involved in operation, maintenance and leakage control of the operator's working refrigeration system used for refrigeration (R), air conditioning (AC) and heat-pump (HP) applications.
The MT works in accordance with the procedures of the operator company that employs him.
The MT shall have the necessary training and knowledge to achieve competence for the tasks outlined in the **Annex 1,** in the groups of activities 3/Technical Reports, 5/Monitoring,and 6/Fault Finding and marked with a blue (O).

2.2 Refrigeration Craftsman

The RC is involved in installation, commissioning, inspection, testing, operation, maintenance, repair and de-commissioning of new, repaired, working and redundant refrigeration systems, and their parts, used for refrigeration (R), air conditioning (AC) and heat-pump (HP) applications.
The RC works in accordance with the procedures of the certified company that employs him.
The RC shall have the necessary training and knowledge to achieve competence for all the tasks outlined in the **Annex 1** (i.e. marked with X and O).

2.3 Certification procedure

Proof of proficiency in the above must be tested by examination and/or assessment before certification in accordance with EN 45013 / ISO 17024.
Certification may be required to be reassessed at regular intervals.

3. Requirements for the Certification of Companies

A company seeking certification must fulfil the following requirements.
The company has :

- to officially state its commitment to comply with the obligations of the Regulation,
- to have at least one person with a valid certificate assessing the competence corresponding to the activities carried out; a current list of the certified personnel shall be supplied,
- the necessary equipment and tools to ensure in particular the safe handling of refrigerants; an informative list is given in **Annex 2**,
- the necessary refrigerant control administration and documentation system; a refrigerant register shall be supplied,
- the necessary work procedures : leakage control, testing, recovery, data collection, log books of equipment serviced, work reports, etc).

No company shall be eligible for certification without having in full time employment, one or more Refrigeration Craftsmen ("RC").

The certified company is involved in installation, commissioning, inspection, testing, operation, maintenance, repair and de-commissioning of any new, repaired, working or redundant refrigeration systems, and their parts, used for refrigeration (R), air conditioning (AC) and heat-pump (HP) applications. The certified company will be eligible to take delivery of refrigerant in accordance with Article 5 (4) of the Regulation.

Where a certified Refrigeration Craftsman is self-employed, he is the legal entity responsible for his activities and he will have to be certified as such also.

Where a maintenance department of an operator company or subsidiary of a larger operator corporation carries out the tasks explained here above and employs Refrigeration Craftsmen, that department / subsidiary shall apply for certification and comply with all the criteria detailed above. The certification shall apply to the department / subsidiary only and not to the parent company.

Where an operator, operator company or in-house maintenance department employs certified Maintenance Technicians ("MT") to carry out the non-intrusive maintenance tasks and authorized leakage checking, but employs no Refrigeration Craftsmen ("RC"), this company shall become registered on an operator company Register to be held by the national Certifying Bodies. The operator company shall not be entitled to take delivery of refrigerant under Article 5 (4) of the Regulation.

Certification provides formal recognition of the company's competence; a company is certified as long as it continues to demonstrate that its competence is maintained.
After a certificate has been issued, the Certifying Bodies shall inspect the company on a regular basis to ensure the certificate can be renewed following a successful visit and report of the Certifying Body's inspector. The auditing will concentrate on competence of personnel, inspection of equipment, equipment calibrating, review of management system, records, relevant documentation and compliance with the work procedures.
The Certifying Bodies will issue requirements and procedures to be followed by companies that are not complying with any of the criteria.
When the Certifying Body declines to renew the certification after an audit, due to non-compliance with the criteria, the company concerned has to file a new application.

Similarly the operator, operator company or in-house maintenance department registered on the operator company Register will be audited by the Certified Bodies before the renewal of its registration.

ANNEXES

Annex 1. Competence of the MT and the RC – assessment criteria
Annex 2. Equipment and tools for the MT and the RC

ANNEX 1

The Annex 1, a portfolio of the needed professional qualifications and skills to work in the field of refrigeration, is the result the the 3-year Leonardo Project EUR/02/C/F/NT-84604 “The Refrigeration Craftsman” (2002-2005)

Leonardo da Vinci

The European Refrigeration Craftsman

A detailed European survey (347 questions) was organized : 355 refrigeration and air conditioning craftsmen from 7 representative countries (DE, ES, FR, HU, NL, SE, UK) have answered a questionnaire designed to make an inventory of the tasks performed by the basic refrigeration craftsman in Europe; the questions addressed 328 activities classified in 17 chapters.
A thorough statistical analysis of the answers received was reviewed by international refrigeration experts to specify the profile of the “European refrigeration craftsman”.

The annex 1 makes up the criteria - as a list of activities that the European refrigeration craftsman has to be capable of performing - on which to prove adequate competence.
It should be used as the objective to be reached by the National RAC (refrigeration & air conditioning – and heat pump) VET (vocational education & training) programmes.

Job Competence		Groups of Activities							
1.1 Basic Thermodynamics **Description**	**The "CERTIFIED PERSON" is capable of giving a theoretical explanation about a basic compression refrigerating system**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
1.1.1	Know the basic ISO standard units as for temperature, pressure, mass, density, energy			O	X	O	O		EN 13313
1.1.2	Understand basic refrigeration terms as: Superheat, High Side, Heat of Compression, Enthalpy, Refrigeration Effect, Low Side, Sub-cooling, Vapor Quality, Saturated Suction			O	X	O	O		EN 13313
1.1.3	Describe the lines of a Log P/h chart of a refrigerant			O	X	O	O		EN 13313
1.1.4	Use the saturation tables of a refrigerant			O	X	O	O		EN 13313
1.1.5	Draw a diagram of a single compression refrigeration cycle			O	X	O	O		EN 13313
1.1.6	Describe the operation and function of the main components	X	X	O	X	O	O		EN 13313
1.1.7	Describe also the operation and function of the following components used in a refrigeration system:								
1.1.8	- Valves (ball valves, diaphragms, globe valves, relief valves)	X	X	O	X	O	O		EN 13313
1.1.9	- Temperature and Pressure Controls	X	X	O	X	O	O		EN 13313
1.1.10	- Sight Glasses and Moisture Indicators	X	X	O	X	O	O		EN 13313
1.1.11	- Defrost Controls	X	X	O	X	O	O		EN 13313
1.1.12	- System Protectors	X	X	O	X	O	O		EN 13313
1.1.13	- Measuring Devices as manifold thermometer		X	O	X	O	O		EN 13313
1.1.14	- Oil Control Systems	X	X	O	X	O	O		EN 13313
1.1.15	- Receivers	X	X	O	X	O	O		EN 13313
1.1.16	- Liquid and Oil Separators	X	X	O	X	O	O		EN 13313
Results									
	A theoretical report explaining the functioning of a refrigeration system to the client/end user.								
	A detailed report about the operation of the refrigeration system with conclusions/recommendations.								

Job Competence		Groups of Activities							
2.1 Component: Compressor **Description**	**The CERTIFIED PERSON is capable of installing, putting into operation and carrying out the maintenance of reciprocating, screw and scroll compressors, single and two stage**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
2.1.1	Explain the function of the compressor in the system	X	X	O	X	O	O	X	EN 13313
2.1.2	Explain the functioning of the compressor	X	X	O	X	O	O		EN 13313
2.1.3	Explain the lubricating system of the compressor		X	O	X	O	O		EN 13313
2.1.4	Explain the capacity control of the compressor		X	O	X	O	O		EN 13313
2.1.5	Install the above mentioned different kinds of compressors incl. control and safety equipment	X	X				X		prEN 378-2 art. 5.1
2.1.6	Adjust the safety and control switches	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.1.7	Adjust the suction and discharge valves	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.1.8	Check the oil return system	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.1.9	Start up and shut down the compressor(s)		X	O	X	O	O	X	prEN 378-2 art. 6.3
2.1.10	Make measurements during operation of compressor		X	O	X	O	O		prEN 378-4 art. 5
2.1.11	Check the good working condition of the compressor		X	O	X	O	O		prEN 378-4 art. 5
2.1.12	Write a report about the condition of the compressor		X	O	X	O	O		prEN 378-4 art. 4.3
2.1.13	Take the decision to repair the compressor			O	X	O	O		prEN 378-4 art. 4.3
2.1.14	Take the decision to replace the compressor			O	X	O	O		prEN 378-4 art. 4.3
Results	A perfectly working compressor contributes to a low energy consumption and a reliable performance as planned for the client.								

Job Competence		Groups of Activities							
2.2 Component: Condenser **Description**	**The CERTIFIED PERSON is capable of installing, putting into operation and carrying out the maintenance of air cooled and water cooled condensers.**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
2.2.1	Explain the function of the condenser in the system	X	X	O	X	O	O	X	EN 13313
2.2.2	Explain the functioning of the condenser	X	X	O	X	O	O		EN 13313
2.2.3	Adjust a discharge pressure control of the condenser		X	O	X	O	O		EN 13313
2.2.4	Install the above mentioned types of condensers incl. control and safety equipment	X	X				X		prEN 378-2 art. 5.1
2.2.5	Adjust the safety and control switches	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.2.6	Check the discharge and liquid lines	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.2.7	Purge non condensable gases out of the condenser		X	X	X	X	X		prEN 378-2 art. 5.1
2.2.8	Start up and shut down all types of condensers		X	X	X	O	O	X	prEN 378-2 art. 6.3
2.2.9	Make measurements during operation of the refrigeration system		X	O	X	O	O		prEN 378-4 art. 4
2.2.10	Check the good working condition of the condenser		X	O	X	O	O		prEN 378-4 art. 4
2.2.11	Check the surface of the condenser			O	X	O	O		prEN 378-4 art. 4
2.2.12	Write a report about the condition of the condenser			O	X	O	O		prEN 378-4 art. 4.3
2.2.13	Take the decision to repair a part of the condenser			O	X	O	O		prEN 378-4 art. 4.3
2.2.14	Take the decision to replace the condenser			O	X	O	O		prEN 378-4 art. 4.3
Results	A perfectly working condenser contributes to a low energy consumption and a minimum of heat load to the environment.								

Job Competence		Groups of Activities							
2.3 Component: Evaporator **Description**	**The CERTIFIED PERSON is capable of installing, putting into operation and carrying out the maintenance of air cooled and liquid cooled evaporators.**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
2.3.1	Explain the function of the evaporator in the system	X	X	O	X	O	O	X	EN 13313
2.3.2	Explain the working of the evaporator	X	X	O	X	O	O		EN 13313
2.3.3	Explain the several ways of defrosting the evaporator			O	X	O	O		EN 13313
2.3.4	Adjust an evaporating pressure control of the evaporator		X	O	X	O	O		prEN 378-2 art. 5.1
2.3.5	Install several kinds of evaporators incl. control and safety equipment	X	X				X		prEN 378-2 art. 5.1
2.3.6	Adjust the safety and control switches	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.3.7	Check the liquid and suction pipelines in the correct position	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.3.8	Check the hot gas defrost pipeline	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.3.9	Adjust evaporation pressure regulation valve		X	O	X	O	O		prEN 378-2 art. 5.1
2.3.10	Start up and shut down all kinds of evaporators		X	O	X	O	O	X	prEN 378-2 art. 6.3
2.3.11	Make measurements during operation of the refrigeration system		X	O	X	O	O		prEN 378-4 art. 4
2.3.12	Check the good working condition of the evaporator		X	O	X	O	O		prEN 378-4 art. 4
2.3.13	Check the surface of the evaporator			O	X	O	O		prEN 378-4 art. 4
2.3.14	Write a report about the condition of the evaporator			O	X	O	O		prEN 378-4 art. 4.3
2.3.15	Take the decision to repair a part of the evaporator			O	X	O	O		prEN 378-4 art. 4.3
2.3.16	Take the decision to replace the evaporator			O	X	O	O		prEN 378-4 art. 4.3
Results	A perfectly working evaporator contributes to a low energy consumption and a reliable performance as planned for the client.								

Job Competence		Groups of Activities							
2.4 Expansion valve & other components **Description**	**The CERTIFIED PERSON is capable of installing, putting into operation and servicing Thermostatic Expansion Valves (TEV) and other components.**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
2.4.1	Explain the function of a TEV in the system	X	X	O	X	O	O	X	EN 13313
2.4.2	Explain the working of a TEV in the system	X	X	O	X	O	O		EN 13313
2.4.3	Explain the functioning of different kinds of expansion regulators		X	O	X	O	O		EN 13313
2.4.4	Install all kind of components in a RAC system, as valves, receivers, separators, etc	X	X				X		prEN 378-2 art. 5.1
2.4.5	Adjust a mechanical and electronic TEV		X	O	X	O	O		prEN 378-2 art. 5.1
2.4.6	Adjust mechanical and electronic thermostats	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.7	Adjust mechanical and electronic pressure limiters	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.8	Check the functioning of an oil separator	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.9	Check (level) a liquid receiver	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.10	Check a sight glass and the condition of the refrigerant	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.11	Check the condition of a filter dryer	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.12	Check the functioning of a solenoid valve	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.13	Check the gland of a stop valve	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.14	Adjust a pressure regulated valve	X	X	O	X	O	O		prEN 378-2 art. 5.1
2.4.15	Write a report about the condition of these components		X	O	X	O	O		prEN 378-4 art. 4.3
2.4.16	Take the decision to repair part of these components			O	X	O	O		prEN 378-4 art. 4.3
2.4.17	Take the decision to replace components			O	X	O	O		prEN 378-4 art. 4.3
Results									
	A perfectly working TEV and other components contribute to a low energy consumption and a good performance as planned for the client.								
	A perfectly fitted and adjusted component contributes to the optimal working of the system.								

Job Competence		Groups of Activities							
3.1 Piping **Description**	**The CERTIFIED PERSON is capable of building a leak tight piping system in a refrigeration installation.**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
3.1.1	Work with copper tubes from a diameter of ¼" (6mm) till 7/8" (28mm) and from 35 mm till 54 mm.	X	X				X	X	prEN378-2 art. 6.2
3.1.2	In particular in the following ways:								
3.1.3	- flared joints diameter of ¼"(6mm) till 3/4" (18mm)	X	X				X	X	prEN378-2 art. 6.2
3.1.4	- bends of copper tubes diameter of ¼"(6mm) till 3/4" (18mm).	X	X				X	X	
3.1.5	- fixed connections by hard soldering diameter ¼" (6mm) till 7/8" (28mm) and from 35 mm till 54 mm.	X	X				X	X	EN 13133
3.1.6	Make hard soldering joints for the following connections:								
3.1.7	• copper-copper	X	X				X		EN 13133
3.1.8	• copper-steel	X	X				X		EN 13133
3.1.9	• copper-brass	X	X				X		EN 13133
3.1.10	Install valves in the correct position	X	X				X		prEN 378-2 art. 5.1
3.1.11	Install flexible insulation	X	X	X	X	X	X		prEN 378-2 art. 5.0
3.1.12	Check the condition of insulation	X	X	X	X	X	O		prEN 378-2 art. 5.1
3.1.13	Make / check pipe- and component supports	X	X	X	X	X	O		prEN378-2 art. 6.3
3.1.14	Perform a strength pressure test	X	X	X	X	X			prEN378-2 art. 6.3
3.1.15	Perform a tightness test		X	X	X	X	X		prEN378-2 art. 6.3
3.1.16	Perform a functional test	X	X	O	X	O	O		prEN378-2 art. 6.3
3.1.17	Perform a conformity test of the complete installation		X	O	X	O			prEN378-2 art. 6.3
Results	Safe and environmentally friendly refrigeration piping system without leakage by starting up and during operation								

Job Competence		Groups of Activities							
4.1 Electrical **Description**	**The CERTIFIED PERSON is capable of installing the electrical cabling and wiring of a refrigeration system.**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
4.1.1	Explain the use of different kinds of cables an wires	X	X				O		EN 50110 art.3.2.4
4.1.2	Explain the use of different kinds of classified connections	X	X				O		EN 50110 art.3.2.4
4.1.3	Explain the use of different kinds of classified IP	X	X				O		EN 50110 art.3.2.4
4.1.4	Explain the different kinds of safety fuses and switches		X		X	O	O		EN 50110 art.3.2.4
4.1.5	Install electrical equipment and motors		X			X	X		EN 50110 art.6.2
4.1.6	Lay cables in the cable routes	X	X				X		EN 50110 art.6.2
4.1.7	Make the wiring of a switch panel	X	X		X		O		EN 50110 art.6.2
4.1.8	Connect the power supply at the main switch panel		X		X		O		EN 60204-1
4.1.9	Connect a single or three phase motor		X		X		O		EN 50110 art.6.2
4.1.10	Connect other electrical components	X	X		X		O		EN 50110 art.6.2
4.1.11	Check the electrical safety according to the EU and National regulations			O	X	O	O		EN 50110 art.5.3
4.1.12	Check the power consumption of a motor			O	X	O	O		EN 50110 art.5.3
4.1.13	Measure the electrical equipment and cabling		X	O	X	O	O		EN 50110 art.5.3
4.1.14	Adjust the electrical safety switches			O	X	O	O		EN 50110 art.5.3
4.1.15	Adjust the electrical equipment			O	X	O	O		EN 50110 art.5.3
4.1.16	Check the rotation direction of a motor			O	X	O	O		EN 50110 art.5.3
4.1.17	Take the decision to repair an electrical component			O	X	O	O		EN 13313
4.1.18	Take the decision to replace an electrical component			O	X	O	O		EN 13313
4.1.19	Write a report about the electrical equipment			O	X	O	O		EN 13313
Results									
	A safe environment for the client and his personnel								
	A reliable electrical system								

Job Competence		Groups of Activities							
5.1 Measurements and Analysis		**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Description	**The CERTIFIED PERSON is capable of measuring and analyzing physical data, and of making a correct diagnosis.**								
		1	**2**	**3**	**4**	**5**	**6**	**7**	
Criteria									
5.1.1	Use a manometer set			X	X	X	X	X	EN 13313
5.1.2	Use a thermometer			O	X	O	O		EN 13313
5.1.3	Use a Torr gauge			O	X	X	X	X	EN 13313
5.1.4	Use scales to weight refrigerant		X	X	X	X	X	X	EN 13313
5.1.5	Use a airflow meter			O	X	O	O		EN 13313
5.1.6	Use an acid test kit to check an oil sample			X	X	X	X		EN 13313
5.1.7	Use a recovery set			X	X		X	X	EN 13313
5.1.8	Handle a refrigerant cylinder			X	X		X	X	EN 13313
5.1.9	Drain oil out of a system			X	X		X	X	EN 13313
5.1.10	Use a multi-meter for measuring Volt/Amp/Ohm			O	X	O	O		EN 13313
5.1.11	Use an electronic leak detection device			O	X	O	O		EN 13313
5.1.12	Use a vacuum pump			X	X		O		EN 13313
5.1.13	Place the data in a Log P/h diagram			O	X	O	O		EN 13313
5.1.14	Place the data in a h/x diagram			O	X	O	O		EN 13313
5.1.15	Use product information			O	X	O	O		EN 13313
5.1.16	Use a computer program to control the system			O	X	O	O		EN 13313
5.1.17	Write a report based on the results of the measurements and draw the correct conclusions			O	X	O	O	X	F-gas regulation
Results									
	Correct information about the condition of the system at the time of measuring / checking, properly recorded, to allow historical review and future reference								

Job Competence		Groups of Activities							
6.1 Communications **Description**	**The CERTIFIED PERSON is capable of informing a client about the working procedures and the use of the refrigeration system.**	**Pre-assembly**	**Installation**	**Technical Report**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
6.1.1	Arrange an appointment with the client		X		X	X	X	X	F-gas regulation
6.1.2	Properly inform the client about the process of operation of the refrigeration system		X		X	O	O	X	prEN 378-4 Art. 4.2
6.1.3	Consider the client's requests		X	O	X	O	O	X	F-gas regulation
6.1.4	Advise the client about maintenance planning			O	X	O	O		F-gas regulation
6.1.5	Advise the client on saving energy		X	O	X	O	O		F-gas regulation
6.1.6	Make the client aware of environmental issues		X	O	X	O	O	X	F-gas regulation
6.1.7	Advise the client on safety issues		X	O	X	O	O		prEN 378-4 Art. 4.2
6.1.8	Process client complaints			O	X	O	O		F-gas regulation
6.1.9	Advise the client with regard to shutting down the refrigeration system			O	X	O	O	X	F-gas regulation
6.1.10	Advise the client whether a new system, or the repair of components, is required			O	X	O	O		F-gas regulation
6.1.11	Explain to the client the work procedures		X	O	X	O	O		F-gas regulation
6.1.12	Explain to the client the content of a report		X	O	X	O	O		F-gas regulation
Results									
	The client has received the necessary information about the system installed, at different times of its life cycle, and understands the performance that he can expect in the future.								

Job Competence		Groups of Activities							
7.1 Environmental and safety regulations **Description**	**The CERTIFIED PERSON is capable of handling the refrigeration system in a way that there is no loss of refrigerant and its operation is safe.**	**Pre-assembly**	**Installation**	**Technical Reports**	**Commissioning**	**Monitoring**	**Fault Finding**	**Dismantling**	**The National Authorities to certify qualifications have to make sure that European and National Regulations, Directives and Norms are complied with; main references are mentioned below**
Criteria		**1**	**2**	**3**	**4**	**5**	**6**	**7**	
7.1.1	Be aware and know the environmental and safety regulations	X	X	O	X	O	O	X	prEN378-4 art. 4.1
7.1.2	Carry out a pressure test to check the strength of the system	X	X						prEN378-1 art. 6.3.3
7.1.3	Carry out a pressure test to check the tightness of the system		X		X		O		prEN378-1 art. 6.3.4
7.1.4	Evacuate the system to a level 270 Pa		X		X		O		prEN378-4 art. 5.3
7.1.5	Fill the system with refrigerant without loss of refrigerant		X		X		X		prEN378-4 art. 5.4
7.1.6	Control the charge of refrigerant			O	X	O	O	X	prEN378-4 art. 5.4
7.1.7	Make a visual inspection of the whole system especially the joints		X	O	X	O	O		prEN378-4 art. 5.1
7.1.8	Make a leak test of the system			O	X	O	O		prEN378-4 art. 5.1
7.1.9	Fill in the data in the logbook			O	X	O	O		prEN378-1 art. 6.4.2.5
7.1.10	Fill in the certificate of the pressure test			X	X		X		prEN 378-4 art. 4.3
7.1.11	Fill in the certificate of the evacuation test			X	X		X		prEN 378-4 art. 4.3
7.1.12	Fill in the certificate of the tighness/leak test			X	X	X	X		prEN 378-4 art. 4.3
7.1.13	Fill in a report with starting up figures			O	X		O		prEN 378-4 art. 4.3
7.1.14	Fill in a report with operational figures			O	X	O	O		prEN 378-4 art. 4.3
7.1.15	Fill in the report about the refrigerant used			X	X		X		prEN 378-4 art. 4.3
7.1.16	Fill in the document for removing dirty refrigerant			X			X	X	prEN 378-4 art. 4.3
7.1.17	Fill in the report about the refrigerant removed out of a system			X			X	X	prEN 378-4 art. 4.3
7.1.18	Fill in a report of dismantling of the system			X				X	F-gas regulation
Results									
	Strict minimum emission of refrigerant								
	The environmental auditors can monitor the history of the system.								

ANNEX 2

Equipment and tools of the certified personnel to be supplied by his employer			MT	RC
	Manifold			x
	Vacuum Gauge			x
	Temperature meter		x	x
	Mobile leak detector		x	x
	Refrigerant weight Scale			x
	Vacuum pump			x
	Vacuum meter			x
	Recovery set			x
	Nitrogen pressure reducer			x
	Recycling cylinder			x