

# EUROPASS DIPLOMA SUPPLEMENT

## TITLE OF THE DIPLOMA (ES)

*Técnico Superior en Mantenimiento de Instalaciones Térmicas y de Fluidos*

## TRANSLATED TITLE OF THE DIPLOMA (EN)<sup>(1)</sup>

*Higher Technician in Thermal and Fluids Installations Maintenance*

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(1) This translation has no legal status.

## DIPLOMA DESCRIPTION

**The holder of this diploma will have acquired the General Competence with regard to:**

Planning, managing and supervising the fitting and maintenance of thermal and fluids installations, in buildings and industrial processes, in accordance with the established regulations and rules, following the protocols of quality, safety, labour risks prevention and environmental protection.

**Within this framework, the PROFESSIONAL MODULES and their respective LEARNING OUTCOMES acquired by the holder are listed below:**

### “Electrical and Automatic Systems”

The holder:

- Selects electrical machines and their associated power supply, protection and control systems, analysing technical requirements and describing their function within the system.
- Configures wired regulation and control systems, analysing technical needs according to the different technologies (pneumatic, hydraulic and electrical), designing schemes and applying regulations.
- Performs fitting operations of automatic system for regulation and control interpreting installation plans and schemes.
- Verifies how automatic security systems work and their conditions carrying out tests and comparing characteristic magnitudes with reference values.
- Identifies malfunctions or failures in automatic systems analysing symptoms and relating them with the causes that produce them.
- Repairs malfunctions or failures in automatic systems verifying restoration of working parameters of the system.
- Configures programmable automatic systems describing how the equipment and elements of the system work and their application.
- Starts programmable automatic systems fitting equipment and preparing programs.
- Carries out fitting operations of programmable automatic systems interpreting schemes and verifying they work.

### “Thermal Equipment and Installations”

The holder:

- Calculates the thermal load of heating, refrigeration and air conditioning installations, using tables, diagrams and computer programs.
- Determines heat production equipment and installations analysing how they work and describing the function that every component carries out in the group as a whole.
- Determines cooling equipment and installations analysing how they work and describing the function that every component carries out in the group as a whole.
- Determines air conditioning and ventilating equipment and installations analysing how they work and describing the function that every component carries out in the group as a whole.
- Determines the parameters that intervene in the transport of fluids using tables, diagrams, nomograms and computer programs.
- Determines fire protection equipment and elements analysing the characteristics of installations and applying current regulations.

### “Installations Fitting Processes”

The holder:

- Identifies the different materials and their treatments used in installations analysing their physical and chemical properties.
- Carries out operations for the transformation of elements applying manual machining and shaping techniques, relating how machines work with the conditions of the process and the characteristics of the product.
- Makes non-welded joints analysing the characteristics of each joint and applying the techniques appropriate to each joint.
- Makes welded joints selecting the appropriate technique for each type of material and installation.

- Fits equipment and elements of cooling and air conditioning installations (hermetic compressors, splits, among others) at a low scale, applying fitting techniques and interpreting plans and the manufacturer's instructions.
- Fits equipment and elements of heating and water heating installations (single boilers and heaters) at a low scale, applying fitting techniques and interpreting plans and the manufacturer's instructions.
- Carries out watertightness tests on thermal and fluids installations applying technical and regulatory criteria.
- Performs operations for the fitting of electrical systems associated with thermal and fluids installations, interpreting fitting instructions and schemes.
- Starts thermal and fluids installations fitted at a low scale, checking they work properly.

#### **“Graphical Representation of Installations”**

The holder:

- Represents elements and equipment of thermal and fluids installations relating them with the normalised symbols applied in plans and schemes.
- Prepares initial schemes for thermal and fluids installations using computer-aided design programs.
- Designs thermal and fluids installations plans applying representation conventionalisms and design programs.
- Designs detailed plans and isometrics of installations describing the selected constructive solution.

#### **“Renewable Energies and Energy Efficiency”**

The holder:

- Calculates energy savings and gas emissions of renewable energy facilities comparing them with conventional facilities.
- Calculates losses due to shade, slope and orientation of a solar facility analysing the location data and environmental conditions.
- Calculates incident energy and radiation absorbed through a solar collector analysing the constructive characteristics and using solar radiation tables.
- Measures solar facilities in buildings analysing thermal needs and applying energy efficiency criteria.

#### **“Fitting, Quality and Maintenance Management”**

The holder:

- Establishes the stages of a fitting and maintenance process in thermal and fluids installations, analysing the technical documentation, quality and safety plan and instruction manuals.
- Prepares the catalogue of spare parts and the management and procurement programmes establishing the conditions for storage of components, tools, materials and equipment.
- Prepares estimates for the fitting and maintenance of installations, assessing work units and applying prices.
- Applies quality plans describing assurance requirements and quality management.
- Designs the schedule for the maintenance of thermal and fluids equipment and installations defining tasks, times, human resources and materials.

#### **“Configuration of Thermal and Fluids Installations”**

The holder:

- Determines the demand of thermal power in thermal installations, analysing the needs programme and use conditions.
- Selects equipment and elements in thermal installations applying calculation procedures.
- Calculates fluids distribution networks associated with thermal installations, analysing their characteristics and measuring their elements.
- Designs initial plans and schemes of thermal and fluids installations applying representation rules and computer-aided design techniques.
- Prepares technical documentation of thermal installations justifying the proposed solution.

#### **“Maintenance of Cooling and Air Conditioning Installations”**

The holder:

- Fits equipment and elements of cooling and air conditioning installations, interpreting fitting plans, schemes and procedures.
- Carries out watertightness tests on cooling and air conditioning installations applying and assessing technical and regulatory criteria.
- Fits electric boards, electrical installations and automatic systems associated with cooling and air conditioning installations, interpreting the manufacturers' plans and instructions.
- Starts cooling and air conditioning installations, defining and applying previous functional tests.
- Performs operations for preventive maintenance of cooling installations, interpreting maintenance plans.
- Diagnoses failures and malfunctions in equipment and installations relating the malfunction with the cause that produces the same.
- Performs operations for corrective maintenance of elements and equipment of cooling and air conditioning installations, justifying the replacement or repair techniques and procedures.

### **“Maintenance of Heat and Fluids Installations”**

The holder:

- Fits heat and fluids installations, interpreting fitting plans, schemes and procedures.
- Carries out watertightness tests on the different circuits of the installation applying and assessing technical and regulatory criteria.
- Fits electric boards, electrical installations and automatic systems associated with heat and fluids installations, interpreting the manufacturers' schemes and instructions.
- Starts heat and fluids installations, defining and applying previous and functional tests.
- Performs operations for preventive maintenance of heat and fluids installations, interpreting maintenance plans.
- Diagnoses failures and malfunctions in equipment and installations, relating the malfunction with the cause that produces the same.
- Performs operations for corrective maintenance of elements and equipment of heat and fluids installations, justifying the replacement or repair techniques and procedures.

### **“Project in Thermal and Fluids Installations Maintenance”**

The holder:

- Identifies the needs of the production sector, relating them with the standard projects that may satisfy them.
- Designs projects related to the competences described in the diploma, including and developing their constituting stages.
- Plans the project implementation, determining the intervention plan and associated documentation.
- Defines the procedures for the monitoring and control of the project implementation, justifying the selection of variables and instruments used.

### **“Professional Training and Guidance”**

The holder:

- Selects job opportunities, identifying the different possibilities of labour integration, and the alternatives of lifelong learning.
- Applies teamwork strategies, assessing their effectiveness and efficiency on the achievement of the company's goals.
- Exercises rights and complies with the duties derived from labour relationships, recognising them in the different job contracts.
- Determines the protective action of the Spanish Health Service in view of the different covered eventualities, identifying the different types of assistance.
- Assesses risks derived from his/her activity, analysing job conditions and risk factors present in his/her labour setting.
- Participates in the development of a risk prevention plan in a small enterprise, identifying the responsibilities of all agents involved.
- Applies protection and prevention measures, analysing risk situations in the labour setting of the Higher Technician in Thermal and Fluids Installations Maintenance.

### **“Business and Entrepreneurial Initiative”**

The holder:

- Recognises skills related to entrepreneurial initiative, analysing the requirements derived from job positions and business activities.
- Defines the opportunity of creating a small enterprise, assessing the impact on the performance setting and incorporating ethic values.
- Carries out the activities for the setting-up and implementation of a company, choosing the legal structure and identifying the associated legal obligations.
- Carries out basic administrative and financial management activities of an SME, identifying the main accounting and tax obligations and filling in documentation.

### **“On the Job Training”**

The holder:

- Identifies the company's structure and organization relating it to the production and marketing of the products obtained.
- Applies labour and ethic habits in his/her professional activity according to the characteristics of the job position and the procedures established by the company.
- Monitors the fitting of cooling and air conditioning installations following the processes of the quality system established by the company and the appropriate safety protocols.
- Plans operations of preventive maintenance in installations fitted by the company, applying the appropriate maintenance plans.
- Supervises the repair of failures and malfunctions in equipment and installations, ensuring the application of corrective maintenance techniques and procedures.

## RANGE OF OCCUPATIONS ACCESSIBLE TO THE HOLDER OF THE DIPLOMA

The Higher Technician in Thermal and Fluids Installations Maintenance works in the industries in charge of fitting and maintaining thermal and fluids installations related with the sub-sector of HVAC (heating, ventilating and air conditioning) and water heating within the industrial sector and the construction and civil works sector.

The most relevant occupations or jobs are the following:

- Technician in the planning and scheduling of the processes aimed at maintaining thermal and fluids installations
- Manager of networks and fluids distribution system fitting staff
- Maintenance staff manager
- Industrial refrigeration technician
- Refrigeration technician
- Air conditioning and ventilating-air replacement technician
- Fluids distribution networks and systems technician
- Heating installations technician
- Heating and water heating systems fitter
- Person in charge of the heating and water heating systems maintenance
- Technician in the maintenance of auxiliary installations of production
- Thermal installations fitting supervisor
- Manager of heat installations maintenance staff

## AWARD, ACCREDITATION AND LEVEL OF THE DIPLOMA

**Name of the body awarding the diploma on behalf of the King of Spain:** Spanish Ministry of Education or the different Autonomous Communities according to their areas of competence. The title has academic and professional validity throughout Spain.

**Official duration of the education/ training leading to the diploma:** 2000 hours.

### Level of the diploma (national or international)

- NATIONAL: Non-University Higher Education
- INTERNATIONAL:
  - Level 5 of the International Standard Classification of Education (ISCED5).
  - Level 5 of the European Qualifications Framework (EQF5).

**Entry requirements:** Holding the Certificate in Post-Compulsory Secondary Education (Bachillerato) or holding the corresponding access test.

**Access to next level of education/training:** This diploma provides access to University studies.

**Legal basis.** Basic regulation according to which the diploma is established:

- Minimum teaching requirements established by the State: Royal Decree 220/2008, of 15 February, according to which the diploma of Higher Technician in Thermal and Fluids Installations Maintenance and its corresponding minimum teaching requirements are established.

**Explanatory note:** This document is designed to provide additional information about the specified diploma and does not have any legal status in itself.

**COURSE STRUCTURE OF THE OFFICIALLY RECOGNISED DIPLOMA**

<b>PROFESSIONAL MODULES IN THE DIPLOMA ROYAL DECREE</b>	<b>CREDITS ECTS</b>
<b>Electrical and Automatic Systems.</b>	100
<b>Thermal Equipment and Installations.</b>	125
<b>Installations Fitting Processes.</b>	125
<b>Graphical Representation of Installations.</b>	65
<b>Renewable Energies and Energy Efficiency.</b>	35
<b>Fitting, Quality and Maintenance Management.</b>	60
<b>Configuration of Thermal and Fluids Installations.</b>	100
<b>Maintenance of Cooling and Air Conditioning Installations.</b>	80
<b>Maintenance of Heat and Fluids Installations.</b>	80
<b>Project in Thermal and Fluids Installations Maintenance.</b>	25
<b>Vocational Training and Guidance.</b>	5
<b>Business and Entrepreneurial Initiative.</b>	4
<b>On the Job Training.</b>	22
	TOTAL CREDITS
	<b>120</b>
<b>OFFICIAL DURATION (HOURS)</b>	<b>2000</b>

\* The minimum teaching requirements shown in the table above comprise 55% official credit points valid throughout Spain. The remaining 45% corresponds to each Autonomous Community and can be described in the **Annex I** of this supplement.

## INFORMATION ON THE EDUCATION SYSTEM

