

# EUROPASS DIPLOMA SUPPLEMENT

## TITLE OF THE DIPLOMA (ES)

*Técnico Superior en Organización del Mantenimiento de Maquinaria de Buques y Embarcaciones*

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

*Higher Technician Maintenance Management of Vessels and Ships Machinery*

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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:**

Organizing and supervising the maintenance works of the propulsion plant, auxiliary machinery and ship's service from the technical information. He/she also organizes the maintenance and assembly service of these elements on ships on shore, defining resources, managing human resources and organizing and doing the engine-room watch keeping, complying with the wording established in international agreements STCW and STCW-f and the existing legislation. He/she also performs assigned tasks related to maintenance, regulation and control, by using technical skills and the established procedures in order to guarantee a safe voyage in the conditions of quality, labour and environmental security defined.

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

### **“Organizing the Maintenance of the Propulsion Plant and Vessels’ Auxiliary Machinery”**

The holder:

- Prepares and starts up propulsion plants, assessing the features of the installations and the functionality of the auxiliary equipment, according to criteria on energetic efficiency.
- Starts up and assesses the functioning of power machines (internal combustion engine, boiler/gas or steam) assessing their performance according to the planning of the voyage.
- On the bases of the available means, schedules and coordinates the preventive and predictive maintenance of the systems for propulsion and ships steering, assessing the technical documentation.
- Monitors and executes preventive and predictive operation of propulsion and steering systems in ships and vessels, defining and organizing the necessary means.
- Identifies failures in vessels and ships propulsion systems, interpreting the instructions and the values for the parameters and using the information contained in the technical documentation.
- Monitors and executes repairing operations of failures in vessels and ships propulsion systems, defining the intervention to carry out from the diagnosis and assessing the restoration of the operability obtained.
- Assesses and complies with the standards on labour and environmental risk prevention during the tasks of supervision and maintenance of the propulsion plant, assessing the associated risks and applying the measures to prevent them, according to the existing rules.

### **“Organizing the Dry Maintenance of Vessels, Ships and the Assembly of Thermal Engines”**

The holder:

- On the basis of the vessel's ground develops plans, diagrams and sketches of circuits, equipment and elements of machines, interpreting and identifying them on general arrangement plans, in the list of the machinery and in the vessel's specification.
- Mechanises elements of machines, defining the features, the processes and the sequence to follow, analysing the technical documentation and applying the quality standards and the security protocols established.
- Makes and repairs elements of the machines by means of cutting and welding techniques, defining the work processes and the security and quality conditions.
- Monitors and executes reparation and inspection works in machines and their parts, restoring their functioning according to quality criteria, assessing and recording the results obtained and producing technical reports.
- Monitors and installs propulsion and governing systems in low-power vessels and ships, defining the methodology according to the type of ship and the propulsion system selected.
- Assesses and complies with the rules on the associated labour and environmental risk prevention and applying measures to prevent them pursuant to the existing rules.

### **“Programming and Maintaining Hydraulic and Pneumatic Automatism in Vessels and Ships”**

The holder:

- Carries out the initial diagnosis in the control, command and regulation system of the vessel of ship, identifying the technology used and defining the operation variables, according to the functionality of its parts.
- Assesses the functioning of the pneumatic and oleo-hydraulic systems, interpreting the technical documentation and checking the required adjustments.

- Supervises and carries out the maintenance of the vessel's automatic systems of control and power, defining the operations and the exact means for each case and developing the required documentations.
- Supervises and assembles automatic systems of pneumatic and oleo-hydraulic technology, producing and interpreting sketches and technical documentation and selecting the necessary parts and tools.
- Sets up electric and electronic systems for regulation and control, interpreting the technical documentation and adjusting performance parameters.
- Programs and verifies programmable logic controllers (PLC), from the control sequence and applying programming, assembly and verification techniques.

#### **“Organizing the Maintenance and Assembly of Installations and Electric Systems in Vessels and Ships”**

The holder:

- Assesses the conditions of the power supply required by the system, analyzing the energy needs and applying procedures of coupling and load distribution of the electric generators of the vessel's main switchboard.
- Assesses the functioning conditions of the switchboard and of the customers, according to the technical documentation, verifying the functioning parameters and regulating the protections in power and operation circuits.
- Assembles electric starting systems of electric systems, engine control and electric and electronic equipment, elaborating the associated sketches and intervening according to the regulations and the technical specifications.
- Sets up and supervises the preventive, predictive and corrective maintenance in the electric systems of the vessel, interpreting the technical documentation and defining the procedures to follow.
- Carries out the corrective maintenance of generators and transformer, engines, motor generators and main distribution frames, analysing technical information and carrying out measurements.
- Carries out the maintenance of continuous current services and circuits, interpreting sketches and carrying out the operations scheduled or required, assessing the operability obtained.
- Assesses and complies with the rules on labour and environmental risk prevention when supervising and maintaining electric and electronic equipment, assessing the associated risks and applying measures to prevent them, pursuant to the existing rules.

#### **“Organizing the Maintenance and Assembly of Cooling Installation and Air-conditioning Systems in Vessels and Ships”**

The holder:

- Assesses the functioning of cooling installation and air-conditioning systems, interpreting the fundamental thermodynamics laws involved in the processes and identifying the function of their components.
- Defines and executes the setting up, functioning and stopping procedures in a cooling installation or air-conditioning system, controlling the working parameters and complying with the rules on labour and environmental security.
- Schedules the preventive maintenance of cooling installation and air-conditioning systems and special installations, interpreting technical documentation and defining the procedures to follow.
- Supervises and carries out the diagnosis in case of dysfunctions and breakdowns in cooling and air conditioning systems, analysing the technical documentation and assessing the functionality of the equipment and systems.
- Supervises and executes the repairing processes in cooling installations, applying standardised procedures and assessing the quality of the interventions carried out.
- Assesses and complies with the rules on labour and environmental risk prevention when executing supervision and maintenance tasks in the propulsion plant, assessing the associated risks and applying the measures to prevent them, pursuant to the existing rules.

#### **“Planning the Maintenance of the Machinery in Vessels and Ships”**

The holder:

- Defines the working procedures to implement a maintenance plan for the vessel's or ship's machinery, analysing its technical features and defining the protocols for action.
- Defines the consumption needs, spare parts, tools and materials needed to make use and maintain the machinery in the vessel, analysing the conditions of stability and defining the load, stowage and trimming, procedures.
- Defines the procedures to monitor and manage the maintenance works and inspection recognitions and classification of the vessel in ship afloat or ship in dry dock.
- Defines the system to organize and supervise the space of the maintenance workshop, defining the necessary resources to guarantee its use and applying the legislation in force.
- Defines system to organize and supervise the space of the workshop in maintenance, defining the necessary resources to guarantee its use and applying the existing rules.
- Sets budgets for spares, materials and consumptions, analysing the relations between quality and costs and applying negotiation skills with customers.
- Elaborates training actions aimed at working groups of vessels and ships maintenance, assessing the development and the result of these actions and applying techniques related to activity-programming, observation and group dynamics.

#### **“Organizing the Watch of the Engine Room”**

The holder:

- Defines the protocols for action that must apply during the watch of the engine room, assessing the information received and the regulation governing the watch.
- Carries out activities of engine seafarer, according to the surveillance and communication protocols established and using real or simulated means.

- Carries out the officer's activities during the ward of the engine room, according to the STCW/STCW-f, supervising the working and maintenance conditions of the systems and machines equipment, complying with the protocols established under normal working conditions.
- Solves contingencies affecting the functioning of the machines systems and occurring during the guard in adverse situations (restricted waters, bad weather, shallow waters, amongst other), analysing the information obtained and making precise interventions to maintain the operability of the services safety.
- Assesses and executes emergency operations during the watch of the engine room, maintaining the leadership and acting according to the protocols established.

### **“English”**

The holder:

- Identifies professional and everyday information in all kind of oral speeches, delivered by any type of communication media in standard language, accurately interpreting the content of the message.
- Interprets professional information contained in complex written texts, comprehensively analysing their contents.
- Issues clear oral messages that are well structured, analysing the content of the situation and adapting himself/herself to the speaker's linguistic register.
- Drafts his/her own documents and reports on the professional activity or academic or daily life, relating the linguistic resources to the purpose of the document.
- Applies professional behaviours and attitudes in communication situation, describing the typical relations and features of the foreign language.

### **“Emergency Control”**

The holder:

- Plans how the vessel has to be left, making control lists, defining maintenance plans and applying the regulations.
- Applies survival techniques in both, in water and aboard survival boats, analysing situations and using the means and the life-saving appliances.
- Plans the fire fighting and the crew's training associated, developing the contingency plan, the control and maintenance of fire fighting equipment and systems, applying the rules.
- Applies fire fighting techniques, by using personal protection systems and fire fighting systems.
- Applies flood control, analyzing the situations created and handling equipment and the available means.
- Characterizes the techniques to prevent and fight accidental pollution, interpreting the applicable regulations and taking into account the contingency plan.

### **“Organizing Health Care on Board”**

The holder:

- Defines the immediate health care to practise to the staff on board, in case of health emergency, identifying the nature and seriousness of the injuries and incorporating the sequence of actions to perform.
- Assesses the degree to which the techniques of immediate health care have to be applied in situations of sanitary emergency produced by common injuries onboard, interpreting their most common symptomatology, identifying and, where appropriate, the established procedures.
- Identifies the need of radio-medical advice, identifying the sanitary emergency in case of accident or illness and assessing the progress of the treatment for the health problem on board.
- Defines the preventive and hygiene measures, assessing the types of illnesses and accidents that may affect the persons on board and taking account the personal hygiene standards and those of the environment that benefit one's health.
- Characterises the available means on board in order to assist any type of transfer or relocation of the patient/injured, interpreting the vessel's documentation and applying health care methodology.
- Conducts the radio-medical consultation, describing the symptomatology of the patient and applying the established methodology and regulations.

### **“Project on Organization of the Maintenance of the Machinery in Vessels and Ships”**

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 Maintenance Management of Vessels and Ships Machinery

### **“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 structure and organization of the company, relating both to the kind of service provided.
- Applies ethical and labour habits in the development of his/her activity, according to the features of the job and to the procedures established by the company.
- Under supervision and according to the existing legislation, schedules the maintenance of the propulsion plant, the equipment and the systems of the vessel or ship afloat and in dry dock, applying procedures established and complying with the rules on labour accident prevention and environmental impact.
- Prepares, sets up and conducting the propulsion plan and auxiliary systems, applying the established protocols.
- Locates failures and identifies operating anomalies in the vessel's propulsion engine, installations and auxiliary equipment, collaborating with the crew in the diagnostic and elaboration of a contingency plan to restore the operability in security conditions.
- Carries out the maintenance of vessels and ships, according to working plans and procedures envisaged, executing, where appropriate, the tasks assigned during the custody of the engine room, according to the applicable legislation.

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

The Higher Technician in Maintenance Management of Vessels and Ships Machinery works as engineer officer, first officer and chief engineer in vessels and ships of civil and fishing vessels, with the tonnage limitations, the engine power and space for passengers established by the applicable legislation, as well as in public and private companies of any size, devoted to the repair, construction and maintenance of ships, either self-employed or for others. Additionally he or she may work, either self-employed or for others, in small and medium-size company, either public or private, devoted to the construction and maintenance of sports and recreational boats, according to the regulations established. It may happen that under certain conditions he or she has to use the English language to communicate.

The most relevant occupations or jobs are the following:

- Chief engineer, according to the attributions established for the first naval technician by the article 14.2 of the Royal Decree 973/2009, of 12 June.
- Engineer officer or first engineer officer, according to the attributions established for the naval technician by the article 14.2 of the Royal Decree 973/2009, of 12 June and by the Resolution of 31 May of 2010 of the Directorate General for the Merchant Marine, establishing the accreditation courses for first naval engineers and naval engineers for the professional practice in merchant vessels up to 6,000 kW.
- Inspector of fishing enterprises
- Head of the electromechanical maintenance team for systems in manufacture industries.
- Head of the team for the installation and maintenance of cooling and air-conditioning systems.
- Head of the workshop for propulsion systems and governance of sport and recreational ships.
- Manager of the workshop for propulsion systems and governance of sport and recreational ships.
- Head of the workshop for electric-electronic systems in sport and recreational ships.
- Head of the workshop for cooling and air-conditioning system and fluid service in sport and recreational ships.
- Expert valuer of sport and recreational boats.

## **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 1075/2012 of 13 July, according to which the diploma of Higher Technician in Maintenance Management of Vessels and Ships Machinery 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**

PROFESSIONAL MODULES IN THE DIPLOMA ROYAL DECREE	CREDITS ECTS
<b>Organizing the Maintenance of the Propulsion Plant and Vessels' Auxiliary Machinery</b>	14
<b>Organizing the Dry Maintenance of Vessels, Ships and the Assembly of Thermal Engines</b>	12
<b>Programming and Maintaining Hydraulic and Pneumatic Automatism in Vessels and Ships</b>	9
<b>Organizing the Maintenance and Assembly of Installations and Electric Systems in Vessels and Ships</b>	10
<b>Organizing the Maintenance and Assembly of Cooling Installation and Air-conditioning Systems in Vessels and Ships</b>	9
<b>Planning the Maintenance of the Machinery in Vessels and Ships</b>	4
<b>Organizing the Watch of the Engine Room</b>	4
<b>English</b>	7
<b>Emergency Control</b>	10
<b>Organizing Health Care on Board</b>	5
<b>Project on the Organization of the Maintenance of the Machinery in Vessels and Ships</b>	5
<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>
OFFICIAL DURATION (HOURS)	<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

