



# MCAST

Malta College of Arts, Science & Technology

MQF Level 4

CE4-A4-19

Advanced Diploma in Liquid Petroleum Gas and  
Plumbing Systems

Course Specification

## **Course Description**

This course combines theoretical knowledge and practical training both in College-based industrial workshops and in an industry-based apprenticeship or work placement. Learners will learn how to analyse and generate solutions to perform typical plumbing installations, alterations, repairs and planned maintenance.

Learners are expected to participate individually and in teams to install pipe systems and fittings and accessories of domestic, commercial and industrial installations.

The course also covers liquid petroleum gas (LPG) systems installed to REWS/MSA standards. Applicants need to be able to work within the industries concerned.

## **Programme Learning Outcomes**

At the end of the programme the learner will be able to:

- 1. Develop vocational skills to enhance employment prospects within the LPG and Plumbing environments;*
- 2. Enable participants to develop a range of Key Skills in Communication, Problem Solving; Working with Others; Information and Communication Technology (ICT) and Numeracy;*
- 3. Develop independent study and research skills;*
- 4. Develop personal and interpersonal skills relevant to a role within the LPG and Plumbing environments;*
- 5. Develop participant's knowledge and vocational skills in main operational areas including plumbing installation; LPG installation; associated plumbing works.*

## **Entry Requirements**

MCAST Diploma in Construction Engineering

or

MCAST Diploma in Heating, Ventilation and Air-Conditioning

or

MCAST Diploma in Building Services Installations (Plumbing or Plumbing and Electrical)

or

MCAST Diploma in Welding and Fabrication

or

MCAST Diploma in Electrical Installations

or

MCAST Diploma in Engineering (Electronics)

or

MCAST Diploma in Mechanical Engineering

or

4 SEC/O-Level/SSC&P (Level 3) passes

Preferred: English, Engineering Technology, Mathematics, Graphical Communication, Design and Technology

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**Current Approved Programme Structure**

<b>Unit Title</b>	<b>ECVET</b>
Science of Gases and Water Technologies	6
System Design and Statutory Regulations	6
Plumbing, Indoor and Outdoor Installations Setting Out	6
Brazing Technologies and Practice	6
Materials for LPG and Plumbing Systems	6
Control equipment, Fiscal Instrumentation and Pumps	6
Domestic and Commercial Cold and Hot Water Supplies	6
LPG Installations and Plumbing	6
Pipe Fabrication	6
Fabrication Drawings and Schematic Diagrams	6
Planning and Administration	6
Safety at Work and Handling Operations	6
Power Tools and Cutting Technologies	6
Central Heating & Thermal Insulation, chiller systems and Drainage	6
LPG and Plumbing Systems - Synoptic Project	12
Communication English	6
Mathematics for Cost and Production Control	6
Computer Aided Design and IT	6
Employability and Work Ethics	6
<b>Total ECVET</b>	<b>120</b>

## Unit: Sciences of Gases and Water Technologies

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

This Unit is designed to enable the candidate to develop an understanding of the fundamental scientific principles that establish LPG and Plumbing Systems. Emphasis on the delivery of this Unit should be on familiarisation with basic concepts and terminology.

The Unit will further enhance the capability of candidates undertaking the Level 4 Diploma in LPG and Plumbing Systems as Science of Gases and Water Technologies is essential to candidate cognitive progress in identification and understanding of the System Types utilised, and the properties that will overall determine operational characteristics of such System Types. It is pertinent that candidates already have basic knowledge of System Types, Installation Methods and Materials used prior to introducing this Unit for commencement.

The Key Skill of Numeracy should be delivered also prior to the introduction of this Unit as there will be calculations and formulae in respective Outcomes; therefore it is essential that candidates are familiar with mathematics at a satisfactory level. Candidates could be provided with formative opportunities and support to enhance skills in the interpretation and presentation of numerical, statistical and graphic data in the LPG and Plumbing context. Unit emphasis will be placed where appropriate on the application of Health & Safety and Sustainability - current codes of practice, legislation and promotion of Sustainability with regards to the environment.

Its anticipated that laboratory work will be used to reinforce some of the principles that the unit highlights.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Identify and Apply Use of Internationally recognized (SI) units of measurement;*
2. *Identify and Understand the Principles of Solids, Liquids and Gases;*
3. *Identify and Understand the Principles of Force and Pressure;*
4. *Identify and Understand the Principles of Energy, Heat, Power and Mechanics.*

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## Unit: System Design and Statutory Regulations

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

The unit will commence in 2nd year of study and will be based around the design of plumbing and liquefied petroleum gas systems, and the statutory regulations pertaining to the areas of technicality. Relevant EN Standard documents will be utilised and referenced for guidance where appropriate. The application and function of the bye-laws, ie scope of bye-laws (systems, responsible people), notification of work, penalties for contraventions, categorisation of good workmanship, 'Approved contractor' status. The installation requirements of systems as specified in current building standards (Malta) regulations and the European standards.

Consideration should be given to the following technical areas including cold water system design, hot water system design, and sanitation and below ground drainage design, central heating system design and liquefied petroleum gas design in plumbing systems.

Centres should also incorporate the following themes, where appropriate, as strands running through each of the sections within the qualification. Although they are not specifically referred to in the content section, (MCAST) regards these as essential in the teaching of the qualification:

- Health and safety, in particular the need to impress upon learners the safety factors when working with water, hot water, flammable gases and electricity
- Functional skills (mathematics, English and ICT)
- Extension tasks and differentiation, inclusion, entitlement and equality issues
- Environmental education and related European issues.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Interpret information sources when undertaking design work on cold water, hot water, sanitation, below ground drainage, central heating and liquid petroleum gas systems;*
2. *Take measurements of building features in order to carry out design calculations;*
3. *Calculate the size of system components used in commercial and domestic dwellings;*
4. *Clarify how to present design calculations in an acceptable format;*
5. *Interpret the legislation controlling the installation and use of systems.*

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## **Unit: Plumbing Indoor and Outdoor Installations and Setting Out**

**Unit level (MQF):** 4  
**Credits :** 6

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### **Unit Description**

This unit provides learning in a range of competences in plumbing indoor and outdoor installations. It involves drainage setting out techniques, knowledge requirements of domestic hot and cold water indoor installations and outdoor cold water plumbing installations. In addition, it explains their methods of setting out prefabricated pipe-work and installing pipe-work in-situ. It selects pipe-work materials and fittings from instructions, plans and drawings and domestic drainage, setting out diagrams of different types of drainage systems.

The unit will involve practical examples of the various systems being considered within the unit. This will both aid understanding, but also give the practice of the practical application of the theories and ideas the unit introduces the students to.

It is anticipated that this unit will provide a strong platform, from which further consideration of specific systems can take place in other units contained within the course. In general it provides an overall understanding of all the plumbing requirements associated with domestic properties.

It should also be noted that any practical work undertaken, should be done so in accordance with all necessary safety requirements, to ensure teaching / learning environment that poses no risk to students and staff members. The use of modern teaching and learning aids, for example, smart boards, and proprietary interactive teaching materials would greatly enhance the learning experience.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Understand the different types of plumbing (indoor) cold water supply and distribution systems;*
2. *Identify cold water (outdoor) installations, local byelaws (Malta) and current EC standards;*
3. *Identify hot water (indoor) installations and their working principles;*
4. *Identify current local sanitation systems and drainage diagrams and setting out pipe-work systems.*

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## Unit: Brazing Technologies and Practice

**Unit level (MQF):** 4

**Credits :** 6

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### Unit Description

This unit identifies the competencies you need to set up and use manual torch brazing and soldering equipment, in accordance with approved instructions or procedures. You will be required to check that all the hoses and equipment are correctly connected, free from leaks or damage, and are ready for use. You will be required to set and adjust the brazing conditions, in line with the specification. You will also need to select and use work holding and manipulating devices that are appropriate to the size and shape of materials and joint configuration being produced. You must operate the equipment safely and correctly and make any adjustments to settings, in order to produce the joints to the required specification.

The unit should be instructed using the following template, health and safety in welding applications, jointing principles for pipe-work material, fundamentals of gas welding, introduction to oxygen/acetylene welding (gas welding), soft solder - jointing techniques, hard Solder - jointing techniques, brazing/bronze welding, welding of mild steel pipe.

Centres should also incorporate the following themes, where appropriate, as strands running through each of the sections within the qualification. Although they are not specifically referred to in the content section, (MCAST) regards these as essential in the teaching of the qualification:

- Health and safety, in particular the need to impress upon learners the safety factors when working with water, hot water, flammable gases and electricity
- Functional skills (mathematics, English and ICT)
- Extension tasks and differentiation, inclusion, entitlement and equality issues
- Environmental education and related European issues.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Identify and understand the jointing principles for pipework materials;*
2. *Recognize the fundamentals of gas welding;*
3. *Identify and understand soft soldering and hard soldering;*
4. *Understand the methods of brazing/bronze welding and welding of Mild Steel Pipe.*

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## Unit: Materials for LPG and Plumbing Systems

Unit level (MQF): 4

Credits : 6

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### Unit Description

The Unit will provide the learner with knowledge and understanding of the materials and components installed in Plumbing and Liquefied Petroleum Gas Systems. Learners will be introduced to the materials and components installed and associated with Hot and Cold water systems, Above and Below ground drainage systems and Liquefied Petroleum Gas installations.

Learners will be able to identify and select materials based on their technical properties and suitability for a range of jointing techniques and methods i.e. welding (metals and plastics); compression and push-fit (metals and plastics). This will involve the learner in development of cognitive and practical skills to specify and select materials based on their suitability for installation and performance.

Learners will be able to identify and select fittings and components based on their design or installation function i.e. fittings and components associated with the installation of a particular plumbing/LPG system, and components and operating methods to allow plumbing/LPG systems to function and perform as designed.

Through identification and selection of materials, fittings and components the learner will gain an understanding of the functions of the individual parts of a system and how this affects the system performance.

### Learning Outcomes

On completion of this unit the learner will be able to

1. *Understand the function of materials and components in Plumbing and Liquefied Petroleum Gas systems;*
2. *Understand the jointing and installation process of materials and components in Plumbing Liquefied Petroleum Gas systems;*
3. *Understand the technical properties of materials and components in Plumbing and Liquefied Petroleum Gas systems;*
4. *Understand the operation and performance of materials and components in Plumbing and Liquefied Petroleum Gas systems.*

## Unit: Control Equipment, Fiscal Instrumentation and Pumps

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

The unit will be developed with regards to the electrical and mechanical controls installed in plumbing & liquefied petroleum gas systems. The unit will also have an outcome based assessment for pumping systems in general. Consideration should be given to the following technical areas including the types of Instrumentation utilised for testing and inspection, instrumentation methods and statutory requirements, electrical control components in plumbing systems, electrical monitoring components in plumbing systems, pumping systems in hot water, cold water & central heating systems, mechanical controls in plumbing systems, liquefied petroleum gas controls - electrical and liquefied petroleum gas controls - mechanical

Providers of the unit should also incorporate the following themes, where appropriate, as strands running through each of the sections within the qualification. Although they are not specifically referred to in the content section, (MCAST) regards these as essential in the teaching of the qualification:

- Health and safety, in particular the need to impress upon learners the safety factors when working with water, hot water, flammable gases and electricity
- Functional skills (mathematics, English and ICT)
- Extension tasks and differentiation, inclusion, entitlement and equality issues
- Environmental education and related European issues.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Understand the requirements of Instrumentation utilised for Testing and Inspection, their Methods and Statutory Requirements*
2. *Understand and describe Pumping Systems in Hot Water, Cold Water & Central Heating*
3. *Outline the types of Mechanical and Electrical controls and monitoring in Plumbing Systems*
4. *Understand the types of Liquefied Petroleum Gas controls and monitoring - Mechanical and Electrical*

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## Unit: Domestic and Commercial Cold and Hot Water Supplies

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

This unit provides the learner with the core knowledge and understanding applied to commercial and domestic hot and cold water systems. The unit will focus on those installations that are categorised as domestic installations. Consideration should be given to the installation criteria, components and operating characteristics of cold water supply & distribution (domestic) and hot water supply & distribution (domestic). The unit will also focus on commercial hot and cold water supply installations and their operating characteristics. Hot & cold water systems will also encompass sustainable technological methods of water delivery/water heating including solar energy. It will also provide learners with knowledge and practical experience in fitting types of domestic and commercial hot and cold water systems and components. Learners will demonstrate the ability to confidently work on mains fed, solar, boosted direct and indirect hot and cold water systems, pipe work, installation and maintenance requirements and recognition, back flow prevention and service protection. This unit also provides learners with the knowledge and experience of carrying out installation and commissioning tasks.

Centres should also incorporate the following themes, where appropriate, as strands running through each of the sections within the qualification. Although they are not specifically referred to in the content section, (MCAST) regards these as essential in the teaching of the qualification:

- Health and safety, in particular the need to impress upon learners the safety factors when working with water, hot water, flammable gases and electricity
- Functional skills (mathematics, English and ICT)
- Extension tasks and differentiation, inclusion, entitlement and equality issues
- Environmental education and related European issues.



## Learning Outcomes

On completion of this unit the learner will be able to

1. *Identify and understand the pipe-work, components and operation of hot and cold water supply & distribution in domestic and solar systems.*
2. *Understand the types of commercial hot and cold water pipe-work installations and their jointing principles*
3. *Identify the installation requirements of boosted water systems, including filtered and reverse osmosis systems for pure water.*
4. *Show an appreciation for controls on commercial and domestic hot and cold water systems and identify the types of fire protection systems*

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## Unit: LPG Installations and Plumbing

Unit level (MQF): 4  
Credits : 6

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### Unit Description

This Unit is designed to enable the candidate to develop an understanding of the operating characteristics and principles of LPG Installations in Plumbing Systems. Emphasis on the delivery of this Unit should be on familiarisation with basic concepts and terminology. The Unit will further enhance the capability of candidates undertaking the Level 4 Diploma in LPG and Plumbing Systems as the Unit LPG Installations and Plumbing is of vital importance to candidates, their cognitive progress in identification and understanding of the LPG Installations utilised, and the properties that will overall determine operational characteristics as such. It is pertinent that candidates already have basic knowledge of System Types and Installations; Materials used and key scientific principles prior to introducing this Unit for commencement. The Key Skill of Numeracy should be delivered also prior to the introduction of this Unit as there will be calculations and formulae in respective Outcomes; therefore it is essential that candidates are familiar with mathematics at a satisfactory level. Interpretation of Line Diagrams and Components is recommended in order for candidates to understand the layouts of Systems and associated controls. Candidates could be provided with formative opportunities and support to enhance skills in the interpretation and presentation of legislative, statistical and performance data in the LPG Installation and Plumbing context. Unit emphasis will be placed where appropriate on the application of Health & Safety and Sustainability - current codes of practice, legislation and promotion of Sustainability with regards to the environment.

### Learning Outcomes

On completion of this unit the learner will be able to

1. Describe the properties of Gases and the Combustion process
2. Explain Gas Safety, LPG Regulations and procedures
3. Describe LPG installations, installation materials, gas pressure and flow, Testing and Purging Procedures.
4. Describe LPG appliances, commissioning and maintenance, burners, regulators and controls.

## Unit: Pipe Fabrication

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

This is a Practical Unit, predominately based in a workshop area or designated space reflective of a real work-based environment. It will in addition to practical pipe fabrication skills provide the learner with a knowledge and understanding within this area. The learner will be involved with pipe-work and components that are reflective of current industry practices and materials.

Activities should include working with pipe and components made from copper, low carbon steel, plastic, stainless steel and cast iron. The unit will also provide the learner with the practical skills and understanding in Jointing Principles for Pipe-work Materials; Measuring Pipe-work and Associated Fittings; Pipe-work Support and Clipping and the application of Installation Requirements (Drawings, Standards, Legislation) i.e. Soundness Testing Requirements of Plumbing & Liquefied Petroleum Gas Systems.

Progression through the unit will gain the learner practical experience and an understanding in system installation; inspection and testing; commissioning; decommissioning; service and maintenance; identification and rectification of faults. Systems should include Hot & Cold water supply; Above and Below ground drainage systems; Central heating systems; liquefied Petroleum Gas systems; boosted and sprinkler systems.

### Learning Outcomes

**On completion of this unit the learner will be able to**

- 1. Understand and describe the jointing principles of fittings and components.*
- 2. Fabricate and assemble pipework details in various materials to given specifications.*
- 3. Plan and install plumbing and Liquefied Petroleum Gas systems to given criteria.*
- 4. Commission and decommission Plumbing and Liquefied Petroleum gas systems to industry standards*

## Unit: Fabrication Drawings and Schematic Diagrams

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

The Unit will focus on Fabrication Drawings and Schematic Diagrams of Domestic and Small Commercial Installations. Emphasis on the delivery of this Unit should be on familiarisation with basic concepts and terminology. It should be delivered to allow candidates to gain cognitive progress towards the understanding of Systems and their respective requirements pertaining to Fabrication Drawings, Schematic Diagrams, Graphical Communication and basic skills required to produce Graphical Information. Consideration should be given to the following technical areas; Cold Water Supply & Distribution, Hot Water Supply & Distribution, Sanitation Systems, Central Heating Systems and an appreciation of Liquefied Petroleum Gas Installation. Candidates will also be participating in Computer Aided Design (CAD) skills/techniques in synchronicity with this Unit. The Unit will provide candidates with knowledge and understanding of the type of systems being installed with respect to LPG and Plumbing Systems, interpretation of measurements in imperial and metric formats, and symbols/legends/components used in industry indicative of competency of construction project development and system design pertaining to installation. The Unit will aim to develop candidate skills in reading and understanding drawings and other forms of graphical communication, ascertaining the necessary skills for the production of graphical information using manual and CAD techniques. Candidates will be introduced to current drawing practices, conventions and will investigate, where appropriate, how to list and schedule components from such drawings. Unit emphasis will be placed where appropriate on the application of Health & Safety and Sustainability - current codes of practice, legislation and promotion of Sustainability with regards to the environment.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Interpret written and graphical communication materials in relation to a system design brief*
2. *Use a range of techniques, media and equipment in graphical instruction & detailing*
3. *Interpret dimensional and schedule data from graphical information from LPG and Plumbing System drawings*
4. *Produce graphical details and schedules using traditional and Computer Aided Design Techniques*

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## Unit: Planning and Administration

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

This unit identifies the knowledge and competences needed to contribute to the development and maintenance of positive working relationships with other people, in accordance with organisational and workplace requirements.

This unit covers the different roles and responsibilities within organisations and the workplace. The learner will be able to identify the current and mandatory legislation, regulations and policies which are required to be complied with in an organisation.

The learner will be able to apply and use the correct planning and administration methods to organise and understand work programmes and the requirements of different trades. The learner will be able to demonstrate the use of formal and informal communication with other persons within a workplace and be able to apply a methodical approach to labour and material estimates.

The learner will understand the use of different communication methods throughout regarding the different personnel and their individual requirements within a workplace. The unit will demonstrate the different types of methods used to ensure all persons within a working environment are informed about work plans and activities that affect them.

The unit will demonstrate how persons within a workplace should know how they can develop and maintain positive working relationships with relevant people. The learner should understand the importance of appearance and behaviour, the feelings and expectations of others, and effective communications.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Identify and understand the members of the construction team and their role within the Building Services industry.*
2. *Identify and understand how to apply information sources in the Building Services industry.*
3. *Communicate with other persons within the Building Services industry*
4. *Apply the correct Planning and Administration methods within a working environment*

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## Unit: Safety at Work and Handling Operations

**Unit level (MQF):** 4  
**Credits :** 6

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### Unit Description

This unit is concerned with the requirements that are essential to enable engineering activities to be carried out safely and effectively. It includes dealing with statutory and organisational requirements in accordance with approved regulations, codes of practice and procedures. It covers responsibilities relating to accident reporting and the identification of hazards and risks.

Students will be introduced to the skills and knowledge to ensure that their own actions do not create any health and safety risks, they do not ignore hazards with significant risk in the workplace and that they take sensible action to put things right.

There are many potential hazards within the welding and fabrication industry. This unit is designed to ensure that those that work within it are aware of the potential dangers, likely hazards and where to source: safety information, appropriate regulations and apply them to the workplace and the people who operate within it.

This unit is about identifying the hazards and risks that are associated with the job. Typically these will focus on the working environment, the tools and equipment that are used, materials and substances that are used, working practices that do not follow laid-down procedures, manual lifting and carrying techniques.

The level at which the unit is aimed is to address vocational application needs and as students gain more workplace experience, their comprehension and implementation of safety matters will improve.



## Learning Outcomes

On completion of this unit the learner will be able to

1. *Understand compliance with statutory health and safety regulations and organisational requirements*
2. *Understand compliance with statutory environmental regulations and organisational requirements*
3. *Know how to implement accident and emergency procedures*
4. *Understand safe working practices and procedures*
5. *Understand the reasons for safe manual handling, how manual handling risk assessments contribute to improving health and safety and the principles, types of equipment and testing requirements associated with manual handling safety*

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## Unit: Power Tools and Cutting Technologies

Unit level (MQF): 4

Credits : 6

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### Unit Description

This unit provides the learner with the core knowledge and understanding when working with power tools and cutting technologies it looks at the properties of plumbing materials when using power tools, types of hand and power tools for use in domestic plumbing installations, liquefied petroleum gas systems, cutting technologies for pipe work materials

- Health and safety, in particular the need to impress upon learners the safety factors when working with water, hot water, flammable gases and electricity
- Functional skills (mathematics, English and ICT)
- Extension tasks and differentiation, inclusion, entitlement and equality issues
- Environmental education and related European issues.

Relevance will be made to the efficiency in choice of particular power tools and cutting technologies, in that the correct and most suitable item has been chosen for use. The unit will work in conjunction with other practical units within the course. Which rely upon a safe working understanding and application in the use of varying power tools and cutting technologies within this vocational area.

### Learning Outcomes

On completion of this unit the learner will be able to

1. *Identify and know the types of hand and power tools for domestic plumbing industry.*
2. *Identify and know the properties of domestic plumbing materials.*
3. *Identify tools for use in Liquefied Petroleum Gas systems.*
4. *Identify specialist tools and cutting technologies.*

## Unit: Central Heating, Thermal Insulation, Chiller Systems and Drainage

Unit level (MQF): 4  
Credits : 6

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### Unit Description

The unit will focus on central heating & thermal insulation, chilled water and drainage systems and their operating characteristics. Central heating systems will also encompass sustainable technological methods of water delivery/water heating. Consideration should be given to the following technical areas including above ground sanitary pipework systems (domestic), below Ground drainage systems - setting out (domestic), central heating systems - Setting Out (domestic), above ground sanitary pipework systems - installation criteria and operating characteristics, Below ground drainage systems - installation criteria and operating characteristics, central heating systems - installation criteria and operating characteristics, materials and components for central Heating systems, identify the current legislation and its use with regard to the environment, safety and maintenance of refrigeration and HVAC systems, primary and secondary refrigerants, procedures for maintenance of systems including charging and recovery of refrigerants, leak detection from refrigeration and HVAC systems, calculations involved in designing refrigeration and HVAC systems using thermodynamic tables and psychometric charts to size compressors, evaporators and condensers and other equipment used in these systems, chilled Water Systems, application of insulation to flat and cylindrical surfaces, handle, move and store resources in thermal insulation, sheet metal insulation protection and work safely and efficiently in a thermal insulation work context.

Centres should also incorporate the following themes, where appropriate, as strands running through each of the sections within the qualification. Although they are not specifically referred to in the content section, (MCAST) regards these as essential in the teaching of the qualification:

- Health and safety, in particular the need to impress upon learners the safety factors when working with water, hot water, flammable gases and electricity
- Functional skills (mathematics, English and ICT)
- Extension tasks and differentiation, inclusion, entitlement and equality issues
- Environmental education and related European issues.

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Understand the key requirements of sanitation and underground drainage systems*
2. *Understand the key requirements of central heating systems*
3. *Understand the key requirements of thermal insulation and chilled water systems*
4. *Understand the key requirements of testing and decommissioning of sanitation, central heating, thermal insulation, chilled water and underground drainage systems*

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## Unit: LPG and Plumbing Systems -Synoptic Project

**Unit level (MQF):** 4  
**Credits :** 12

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### Unit Description

This Unit Project will involve the learner in applying knowledge and skills gained throughout the course in a holistic approach to the content of year three of study. It will involve communicating theoretical and technical information of the design.

The unit should focus on the design of Plumbing and Liquefied Petroleum Gas Systems for a Small Commercial Property - Restaurant, Public Building etc. at the discretion of the Centre.

Consideration should be given to the following technical areas when designing Systems:

- Cold Water Systems
- Hot Water Systems
- Above Ground Sanitary Systems
- Below Ground Drainage Systems
- Central Heating Systems
- Liquefied Petroleum Gas Supplies
- Fire Protection Systems
- Boosted Systems (if appropriate to design)

The design of the above technical areas should include:

- System Design Requirements, Statutory Legislation and EN Standards
- Selection of Materials and Components
- Calculations to determine System Efficiencies
- Calculation of Resources for Design Project
- Commissioning Procedures pertaining to Systems

## Learning Outcomes

On completion of this unit the learner will be able to

1. *Design and present a Plumbing and Liquefied Petroleum gas system appropriate to the outlined criteria.*
2. *Specify materials and components for the Plumbing and Liquefied Petroleum gas system chosen based on the design criteria.*
3. *Determine technical information for the Plumbing and Liquefied Petroleum gas system chosen based on the design criteria.*
4. *Determine commissioning and operating procedures for the Plumbing and Liquefied Petroleum gas system chosen to ensure system performance.*

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