

Electrical & Mechanical Services
Industry

Gas Engineering Branch

Specification of Competency Standards

1st Edition

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Chapter 1

Preface

Background of the Industry

Gas industry has a long history in Hong Kong. Gas has been widely and popularly used by households and industrial and commercial sectors in Hong Kong. The major types of gas are Towngas and liquefied petroleum gas (LPG). Gas safety has such a great influence on the public that the Hong Kong Government formally implemented the Gas Safety Ordinance in 1991, authorizing Electrical and Mechanical Services Department to regulate gas safety in the importation, manufacture, storage, transport, supply and use of gas in order to enhance the quality of works and manpower in the industry. In recent years, the application of LPG has been extended to taxis and minibuses and it has become a fuel for vehicles. As regards natural gas, it is used for electricity generation now. However, subsequent to its exploitation, it will replace naphtha and become the key feedstock for producing Towngas in future.

Current Situation of the Industry

2. Following Hong Kong's economic development, by the end of 2004, there were seven registered gas suppliers, 3,533 registered gas installers and 432 registered gas contractors in Hong Kong. As for customers, there were approximately two million residential customers and industrial and commercial customers.

3. Gas application is very popular in Hong Kong. Nowadays, all newly built residential buildings are installed with pipes for gas supply. As regards household applications, the promotion of gas cooking in the past has also been extended to hot water supply and clothes drying. In face of these various changes, apart from supplying the public with suitable and safe gas, practitioners of the Gas industry are also required to provide environmentally friendly and effective service. The skill-based service provided by practitioners in the past has also developed into engineering service. Besides, the application of gas in the industrial and commercial sectors has become diversified. Even though in face of competition from other energy sources like electricity, gas practitioners still give full scope to their creativity and have launched new appliances and applications to the market.

4. As China opens up the Mainland market, Hong Kong's Gas industry has actively searched for development opportunity. By the end of 2004, it has totally 29 joint venture city-gas projects in Mainland. Undoubtedly, Hong Kong's Gas industry is the key operator of Mainland's downstream market. Given its profound experience, advanced technology and its edge in professional knowledge, Hong Kong's Gas industry has gained full scope of development in Mainland. The migration of Hong Kong gas practitioners to the Mainland has also become a trend.

5. Nowadays operatives engaged in Gas industry need to undergo specific training to obtain registered gas installer qualifications from the Electrical and Mechanical Services Department. Similarly, there are also systems for engineer registration. In face of the continuous development of the industry and the increasing market demand on the Gas industry, training and enhancement of the techniques and competency of practitioners affords no delay.

Specification of Competency Standards

6. In view of the industry's current situation and future development trend, it is imminent that the Specification of Competency Standards (SCS) be formulated to provide a solid framework for training to enhance the industry's technical capability, competitiveness and quality of service.

7. The SCS consists of competency standards of different levels. Competency standards are benchmarks for the industry-specific knowledge, professional skills and soft skills required for performing different job functions of the industry. The functional areas and competency standards under SCS will be practical and competence-based. The SCS not only sets out the professional knowledge and skills required for today, but also takes into account factors such as the development trend of both the industry and the society.

8. In the long run, the industry-recognised SCS will become the blueprint for training. It will not only ensure that training providers can meet the industry's present and future needs by offering training courses covering all the knowledge and skills required by the industry, but also provide employees with a clear set of learning pathways, so that they can draw up their own learning and career roadmaps. As such, the SCS will complement the full-scale

implementation of the Qualifications Framework by the Government.

9. The E&M Industry Training Advisory Committee (ITAC), comprising representatives of employers, employees, the Government and professional bodies of the industry, has prepared a preliminary version of “SCS for the E&M Industry –Gas Engineering Branch” with reference to its current status and development trend, as well as the standard and format adopted in the Mainland and overseas, with a view to providing practitioners with clear guidelines for devising their own learning and career roadmaps.

Chapter 2

Qualifications Framework

Qualifications Framework

10. The E&M Industry Training Advisory Committee (ITAC) was set up by the Education Bureau in January 2005 to facilitate the implementation of the Hong Kong Qualifications Framework (QF) in the industry. The proposed QF is a voluntary system. It is a seven-level hierarchy that provides benchmarks for determining the level of complexity and difficulty of individual competencies. It is also used to order and support qualifications of different natures and titles. The QF has in place an independent quality assurance (QA) system that would enhance recognition and acceptance of the qualifications in the industry, irrespective of the mode and source of learning.

11. The E&M ITAC is responsible for the development of its industry-specific, task-based SCS for the identified core functional areas. The SCS, in the form of Units of Competencies (UoCs), provides not only quantitative and qualitative specifications on the competencies required for specific tasks, but also the integrated outcome standards required as well as information on the QF level and credits.

12. The SCS may be used to aid vocational curriculum design by vocational education and training providers, or in-service employee development by HR personnel, or best practice recognition and qualifications by awarding bodies within the industry. SCS is the cornerstone to enhance workforce competitiveness and industry sustainability in the long run.

13. The QF aims to provide clear learning pathways for individuals to draw up their own roadmaps to obtain quality assured qualifications. Learners can either pursue a specific learning pathway to upgrade their skills in a particular area of specialization in a gradual and orderly manner (vertical development), or progress through traversing learning pathways to become multi-skilled (horizontal development). Through the full-scale implementation of the QF, we will foster a vocational environment and culture conducive to lifelong learning and continuing education in the industry. With the active participation of employers and employees as well as the wide acceptance of the industry, the QF will also encourage the development of quality training programmes by providers to meet the needs of the community

and the industry.

Qualifications Framework levels

14. The QF has seven levels, from level 1 to level 7, where level 1 is the lowest and level 7 the highest. The outcome characteristic of each level is depicted by a set of generic level descriptors (GLD) (Appendix 1). The GLD specifies for each QF level its generic complexity, demand and challenges in the four dimensions below:

- a. Knowledge and intellectual skills;
- b. Process;
- c. Application, autonomy and accountability; and
- d. Communications, IT skills and numeracy.

The UoCs (See Chapter 4) are benchmarked to the QF levels in accordance with the GLD. It is worth to note that competency elements in a UoC may fall in some or all of the GLD dimensions as what it naturally should be. The QF level assignment is essentially a holistic judgement on the unit's integrated outcome requirement.

15. QF levels are discrete. That is, there cannot be assignment of UoC in-between QF levels. Also, UoCs that may not fully match the characteristic requirement of one or more dimensions of a level would be "rounded" to the level below.

Chapter 3

Competency Standards

Major Functional Areas of the Gas Engineering Branch in the Electrical & Mechanical Services Industry

16. As proposed by the Electrical and Mechanical ITAC, functional areas of the Gas Sector should focus on gas supply and services, supported by the sales of products and appliances. The Specification of Competency Standards (SCS) may consist of the following major functional areas:

(i) Design

This functional area covers the application of gas related knowledge, including legislations, standards, codes of practice and guidelines. Practitioners should apply the knowledge, together with engineering and technological knowledge, technical know-how and design technique, to design highly effective, safe and reliable gas supply system, equipment and application solutions for primary gas supply network, pipework, equipment, appliances and waste exhaust, etc. according to customers' requirements, environmental considerations and future development.

(ii) Installation and Commissioning

This functional area requires practitioners to apply gas related knowledge and skills to install and commission various kinds of gas supply system, pipework and equipment according to ideas of design, installation specifications, legislations, standards, codes of practice and guidelines, so as to achieve the best performance and comply with the safety standards, thus ensuring the safety of the public and premises. The practitioners should also provide relevant information and user guidelines to the customers.

(iii) Operation, Repair and Maintenance

This functional area requires practitioners to apply gas related knowledge, engineering and technological knowledge and technical know-how in the understanding of system and equipment functions. They should be able to operate, monitor and keep record of the systems and equipment; and be able to carry out preventive maintenance, fault repair and replacement for the systems and equipment so as to ensure the safety of the public and premises. The practitioners should also provide relevant information and user guidelines to the customers.

(iv) Project Management

This functional area requires practitioners to apply gas related knowledge, engineering and technological knowledge, technical know-how and project management knowledge in preparing cost estimates and tender documents, formulating and coordinating gas works and other engineering processes and plans for an effective control of costs and resources, enabling the project to complete on time with suitable manpower resources and logistic control while conforming with environmental protection and occupational safety and health policies.

(v) Operation Management

This functional area requires practitioners to apply management knowledge, skills, planning, organization and control in formulating quality management system, manpower training schemes and safety monitoring policy conforming with gas related legislations, standards, codes of practices and guidelines, so as to achieve effective management and provide safe and reliable gas services.

(vi) Safety, Health and Environment

This functional area requires practitioners to apply gas related knowledge, engineering and technological knowledge, technical know-how and safety and health management knowledge in risk assessment of works and utilization of gas system and equipment. They should be able to formulate safety systems and guidelines that comply with the legislations and suit the actual environment, so as to ensure the safety of the workers and customers.

(vii) Quality Management

This functional area requires practitioners to apply quality management knowledge and skills to formulate and implement procedures for gas related construction, maintenance and repair works according to the legislations, standards, codes of practice and guidelines, so as to ensure a quality, suitable and efficient service for gas products and work.

(viii) Marketing and sales

This functional area covers knowledge of gas related products and their pricing, characteristics and supply, with which practitioners should be able to promote the products and services to customers according to the market trend and corporate marketing strategy.

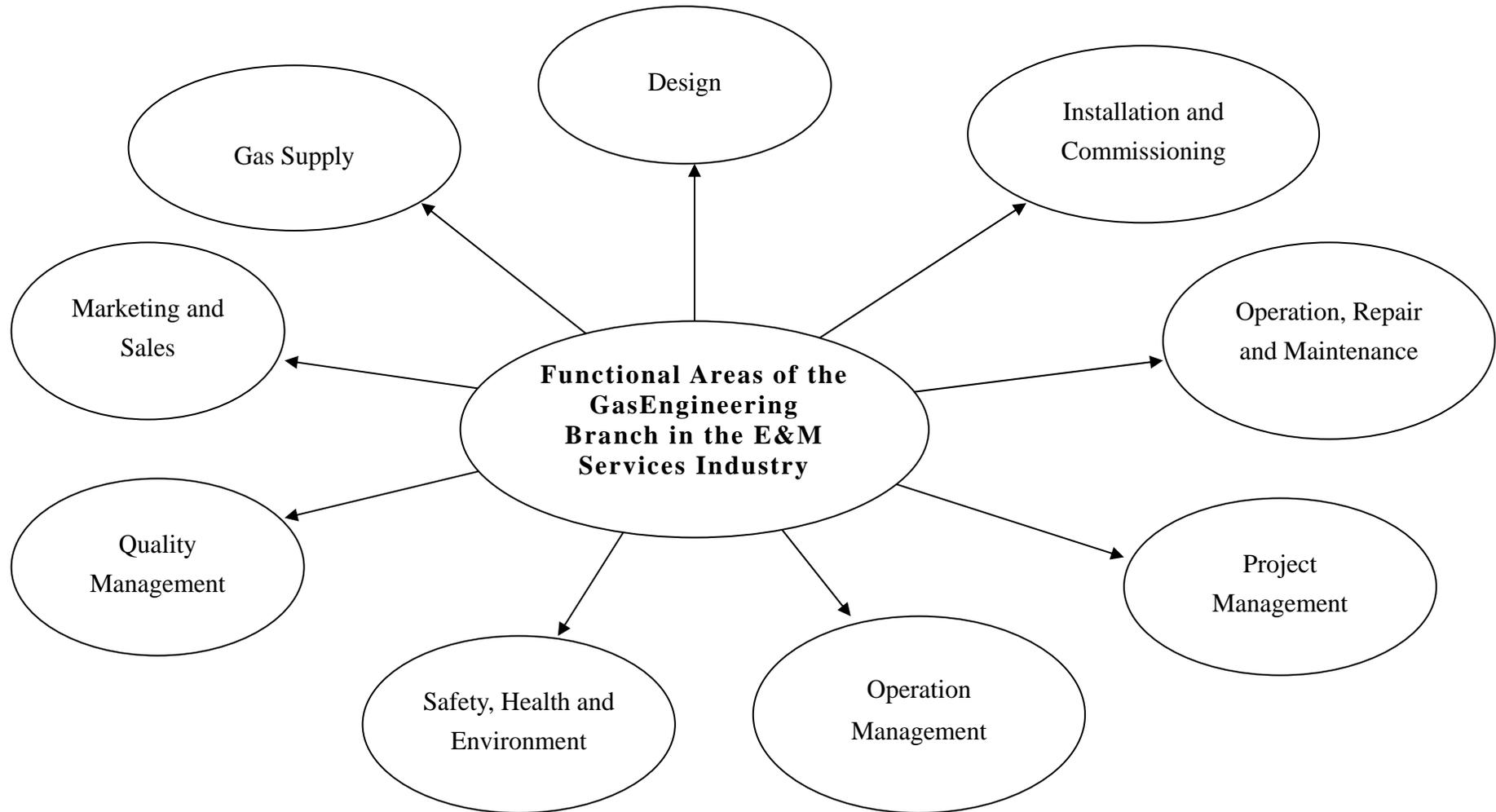
(ix) Gas Supply

This functional area covers knowledge of gas related legislations, standards, codes of practices, guidelines, production and supply, with which practitioners should be able to supply gas to customers, and implement appropriate, safe, reliable and systematic management for gas storage and transport.

Please refer to Diagram 1 for further information.

17. Based on the generic level descriptors and the major functional areas, the E&M ITAC has formulated a “List of Competencies” (Chapter 4) for the industry. The list provides details of the training requirements of the industry in regard to the different competency levels and functional areas. It is designed to provide clear and unified guidelines for drawing up individual learning roadmaps. Learners may either pursue a specific learning pathway to upgrade their skills in a particular area of specialisation in a gradual and orderly manner (vertical development), or progress along a number of learning pathways to become multi-skilled (horizontal development).

Functional Map showing the Major Functional Areas of the Gas Engineering Branch in the Electrical & Mechanical Services Industry



Competency Standards

18. Competency standards refer to the skills and knowledge required for a particular job function. They represent the industry benchmarks for the skills, knowledge and attributes required to perform competently in a particular job. Thus they are the most important part of the SCS.

Units of Competencies

19. The E&M ITAC has set out the competency standards for various job functions in the form of units of competencies, which describe the performance and standard required for each competency. Please refer to Chapter 4 for details.

Every “unit of competency” comprises eight basic items:

1. Title
2. Code
3. Range
4. Level
5. Credits
6. Competency
7. Assessment Criteria
8. Remarks

Recognition of Prior Learning

20. A major concept of QF is that individuals may acquire knowledge and skills from their work experience, apart from attending formal training courses. People may, through the Recognition of Prior Learning (RPL) mechanism, obtain relevant qualifications if their experience, skills and knowledge gained in the workplace meet the competency standards set by the ITAC.

21. Since in-house training has long been the major training opportunity for employees of the E&M industry, it is extremely difficult to determine whether such training has met the competency standards. Therefore, the ITAC will consult members of the industry to develop an appropriate RPL mechanism.

Chapter 4

Units of Competencies of the Gas Engineering Branch in the Electrical & Mechanical Services Industry

List of Competencies of the Gas Engineering Branch in the Electrical & Mechanical Services Industry

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
1	Basic knowledge of gas application (3 Credits) <u>EMGADE101A</u> (P. 25)	Apply basic bench fitting techniques and use small typical hand tools (9 Credits) <u>EMCUIN106A</u> (P. 31)	Refuel LPG vehicle, operate dispenser and related gas supply system (7 Credits) <u>EMGAOR101A</u> (P. 36)			Work at LPG filling stations (3 Credits) <u>EMGASH101A</u> (P. 40)			
	Use typical electrical meters (3 Credits) <u>EMCUDE101A</u> (P. 27)	Identify different types of pipe materials and their range of application (3 Credits) <u>EMCUIN109A</u> (P. 34)	Operate LPG cylinder filling system (5 Credits) <u>EMGAOR102A</u> (P. 38)			Work safely at construction sites (4 Credits) <u>EMGASH102A</u> (P. 42)			
	Identify general properties of different types of typical electrical and mechanical engineering materials (3 Credits) <u>EMCUDE109A</u> (P. 29)					Work safely at LPG compounds (3 Credits) <u>EMGASH103A</u> (P. 44)			
						Use general personal protective equipment (3 Credits) <u>EMCUSH108A</u> (P. 45)			

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
1						Perform manual handling operation (3 Credits) <u>EMCUSH109A</u> (P. 47)			
						Safety operation in confined spaces (3 Credits) <u>EMCUSH110A</u> (P. 48)			
						Comply with the legal requirements on electrical and mechanical occupational safety and health (3 Credits) <u>EMCUSH111A</u> (P. 49)			
						Comply with the legal requirements on environmental protection (3 Credits) <u>EMCUSH112A</u> (P. 51)			
						Handle general chemicals safely (3 Credits) <u>EMCUSH113A</u> (P. 52)			

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
OF Levels	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency
2	Design installation work for gas pipes, appliances, meters and relevant facilities in domestic premises (4 Credits) EMGADE201A (P. 55)	Install and test supply system and ancillary systems in LPG filling station (9 Credits) EMGAIT201A (P. 59)	Maintain and repair supply system and leakage detection system in LPG filling station (14 Credits) EMGAOR201A (P. 92)		Operate LPG filling station (6 Credits) EMGAOM201A (P. 101)			Sell gas appliances to domestic customers (3 Credits) EMGAMS201A (P. 109)	Confirm that LPG cylinders are suitable for further use (3 Credits) EMGAGS201A (P. 111)
	Use computer to draw mechanical drawings (8 Credits) EMCUDE212A (P. 57)	Perform pressure tests, purging and commissioning for installation pipes, service pipes and relevant equipment (9 Credits) EMGAIT202A (P. 62)	Maintain and repair gas service pipes (6 Credits) EMGAOR202A (P. 94)		Operate LPG cylinder wagon (3 Credits) EMGAOM202A (P. 103)				
		Install and lay gas mains (electro fusion method) (6 Credits) EMGAIT203A (P. 64)	Maintain and repair domestic gas appliances (10 Credits) EMGAOR203A (P. 96)		Operate LPG road tanker (3 Credits) EMGAOM203A (P. 105)				
		Install and connect hotplate to LPG cylinder (7 Credits) EMGAIT204A (P. 66)	Operate LPG road tanker equipment (4 Credits) EMGAOR204A (P. 98)		Apply effective communication skills in discussions of electrical and mechanical issues (3 Credits) EMCUOM204A (P. 107)				

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
2		Install domestic flued gas appliances (6 Credits) EMGAIT205A (P. 68)	Operate LPG cylinder wagon and complete the LPG delivery process (3 Credits) EMGAOR205A (P. 100)						
		Install domestic flueless gas appliances (6 Credits) EMGAIT206A (P. 70)							
		Install indoor domestic gas pipes and relevant equipment (5 Credits) EMGAIT207A (P. 72)							
		Install indoor commercial and industrial gas pipes and relevant equipment (5 Credits) EMGAIT208A (P. 74)							

<u>Functional Areas</u>	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
<u>QF Levels</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
2		Install gas mains (steel pipes) (6 Credits) EMGAIT209A (P. 76)							
		Install and lay gas mains (ductile iron pipes) (6 Credits) EMGAIT210A (P. 78)							
		Install domestic and commercial and industrial gas service pipes and relevant equipment (5 Credits) EMGAIT211A (P. 80)							
		Install and lay gas mains (automatic butt fusion method) (6 Credits) EMGAIT212A (P. 82)							
		Install general plastic pipes and fittings (3 Credits) EMCUIN216A (P. 84)							

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
2		Install metallic (steel/stainless steel/galvanized iron) pipes and fittings (3 Credits) <u>EMCUIN217A</u> (P. 86)							
		Install non-metallic (copper/aluminium) pipes and fittings (3 Credits) <u>EMCUIN218A</u> (P. 88)							
		Basic manual metal arc welding (MMAW)/shielded metal arc welding (SMAW) (6 Credits) <u>EMCUIN225A</u> (P. 90)							
3	Design domestic gas supply system (service pipes and relevant equipment) (5 Credits) EMGADE301A (P. 114)	Install, test and commission fixed gas detection system and other relevant instruments (7 Credits) EMGAIT301A (P. 120)	Handle general gas leakage in premises (4 Credits) EMGAOR301A (P. 136)	Building services supervision at work site (9 Credits) EMGAPM301A (P. 153)	Handle LPG vehicle failure safely (4 Credits) EMGAOM301A (P. 155)	Arrange to carry out engineering work safely in explosion-proof and hazard zones (3 Credits) EMGASH301A (P. 160)	Implement quality control and quality assurance (4 Credits) <u>EMCUQM303A</u> (P. 168)	Sell gas appliances to commercial and industrial customers (5 Credits) EMGAMS301A (P. 172)	

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
OF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
3	Use computer to draw combined services drawings of building services (5 Credits) <u>EMCUDE317A</u> (P. 116)	Install and commission commercial and industrial gas appliances (7 Credits) <u>EMGAIT302A</u> (P. 122)	Inspect and repair gas supply system of LPG vehicle (5 Credits) <u>EMGAOR302A</u> (P. 137)		Handle complaints and understand the situations (3 Credits) <u>EMGAOM302A</u> (P. 157)	Arrange and monitor engineering work to be carried out safely (6 Credits) <u>EMGASH302A</u> (P. 162)	Formulate simple quality assurance plan and quality assurance reports (6 Credits) <u>EMCUQM304A</u> (P. 170)		
	Choose typical materials for electrical and mechanical work (3 Credits) <u>EMCUDE318A</u> (P. 118)	Install and commission LPG supply system of LPG vehicle (8 Credits) <u>EMGAIT303A</u> (P. 124)	Maintain and repair underground gas mains (9 Credits) <u>EMGAOR303A</u> (P. 139)		Schedule and arrange overhaul for gas supply network (3 Credits) <u>EMGAOM303A</u> (P. 158)	Make LPG road tanker and cylinder wagon travel safely on the road (3 Credits) <u>EMGASH303A</u> (P. 164)			
		Carry out live gas main installation (8 Credits) <u>EMGAIT304A</u> (P. 126)	Maintain and repair LPG supply system (9 Credits) <u>EMGAOR304A</u> (P. 141)			Investigate general industrial accidents (3 Credits) <u>EMCUSH305A</u> (P. 166)			
		Install, test and commission LPG storage tank (9 Credits) <u>EMGAIT305A</u> (P. 128)	Maintain and repair commercial and industrial gas appliances (10 Credits) <u>EMGAOR305A</u> (P. 143)						

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
3		Install and commission gas pressure control equipment in supply network (6 Credits) EMGAIT306A (P. 130)	Maintain and repair Towngas off-take (6 Credits) EMGAOR306A (P. 145)						
		Perform pressure tests, purging and commissioning for gas mains (8 Credits) EMGAIT307A (P. 131)	Handle general gas leakage in underground gas mains (3 Credits) EMGAOR307A (P. 146)						
		Inspect, commission and decommission LPG supply system (9 Credits) EMGAIT308A (P. 132)	Control general gas leakage in LPG supply system and LPG vehicle filling station (3 Credits) EMGAOR308A (P. 148)						
		Perform manual metal arc welding (MMAW) / shielded metal arc welding (SMAW) on different kinds of steel according to drawings (4 Credits) EMCUIN321A (P. 134)	Repair, test and evaluate functions of gas equipment of road tanker (7 Credits) EMGAOR309A (P. 150)						

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
3			Maintain and repair Towngas off-take (6 Credits) EMGAOR310A (P. 152)						
4	Design general commercial and industrial flue gas appliances (8 Credits) EMGADE401A (P. 175)	Perform installation, testing and commissioning for off-take (7 Credits) EMGAIT401A (P. 183)	Analyze and make preventive routine maintenance arrangements for gas equipment (7 Credits) EMGAOR401A (P. 184)	Gas supply system and equipment installation project management (12 Credits) EMGAPM401A (P. 188)		Risk assessment of gas engineering processes (5 Credits) EMGASH401A (P. 190)	Implement quality management in electrical and mechanical engineering services (6 Credits) EMCUQM402A (P. 192)		Manage gas loading/unloading procedures (4 Credits) EMGAGS401A (P. 194)
	Design general commercial and industrial flueless gas appliances (6 Credits) EMGADE402A (P. 178)		Handle general gas leakage emergencies (4 Credits) EMGAOR402A (P. 186)						
	Design low pressure gas piping network and relevant pressure regulation control equipment (6 Credits) EMGADE403A (P. 181)								

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
OF Levels	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency	Unit of Competency
5	Design commercial and industrial gas supply system (service pipes and relevant equipment) (4 Credits) EMGADE501A (P. 197)	Test and commission gasholders (10 Credits) EMGAI501A (P. 212)	Handle major gas emergencies (6 Credits) EMGAOR501A (P. 214)		Crisis management for gas supply (5 Credits) EMGAOM501A (P. 218)	Risk assessment for gas work (5 Credits) EMGASH501A (P. 219)	Formulate and analyze quality assurance reports (3 Credits) EMCUQM504A (P. 225)		Examine and assess LPG cylinders / tanks / vaporizers / gas mains (7 Credits) EMGAGS501A (P. 226)
	Design special types of commercial and industrial gas application systems (5 Credits) EMGADE502A (P. 199)		Maintain normal operation of gas supply network (9 Credits) EMGAOR502A (P. 216)			Formulate occupational safety and health and environmental protection schemes (6 Credits) EMCUSH505A (P. 220)			
	Design intermediate and medium pressure gas piping network and relevant pressure regulation control equipment (4 Credits) EMGADE503A (P. 202)					Formulate environmental protection management system (3 Credits) EMCUSH507A (P. 223)			
	Design LPG filling station and supply system (11 Credits) EMGADE504A (P. 204)								

Functional Areas	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
QF Levels	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
5	Design high pressure gas piping network and relevant pressure regulation control equipment (6 Credits) EMGADE505A (P. 206)								
	Write all kinds of electrical and mechanical engineering reports in Chinese (6 Credits) EMCUDE506A (P. 208)								
	Write all kinds of electrical and mechanical engineering reports in English (6 Credits) EMCUDE507A (P. 210)								
6	Design and plan gas supply network system to meet social development (10 Credits) EMGADE601A (P. 230)								

<u>Functional Areas</u>	<u>Design</u>	<u>Installation and Commissioning</u>	<u>Operation, Repair and Maintenance</u>	<u>Project Management</u>	<u>Operation Management</u>	<u>Safety, Health and Environment</u>	<u>Quality Management</u>	<u>Marketing and Sales</u>	<u>Gas Supply</u>
	(DE)	(IT)	(OR)	(PM)	(OM)	(SH)	(QM)	(MS)	(GS)
<u>QF Levels</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>	<u>Unit of Competency</u>
7					Formulate overall operation development direction and strategy (20 Credits) <u>EMCUOM701A</u> (P. 233)				

Competency Level 1

1. Title	Basic knowledge of gas application
2. Code	EMGADE101A
3. Range	Have basic knowledge of the composition, properties and manufacturing and production process of Towngas, liquefied petroleum gas (LPG) and natural gas as well as requirements of gas ordinances and codes of practice for all situations; apply the knowledge in gas related work; and understand typical terms of the gas industry.
4. Level	1
5. Credits	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Basic knowledge and principles of gas application</p> <ul style="list-style-type: none"> ◆ Understand the composition of Towngas, LPG and natural gas ◆ Understand the properties of Towngas, LPG and natural gas ◆ Understand the manufacturing and production process of Towngas, LPG and natural gas ◆ Understand the handling method of Towngas, LPG and natural gas leakage ◆ Understand the safety concerns for using Towngas, LPG and natural gas ◆ Understand the combustion properties of gaseous fuel (including Towngas, LPG and natural gas) ◆ Understand the hazard of incomplete combustion ◆ Understand the storage methods of Towngas, LPG and natural gas ◆ Understand the transportation methods of Towngas, LPG and natural gas ◆ Understand the range of application of different types of gas appliances ◆ Understand the basic structure of different types of gas appliances ◆ Understand the working principles of different types of gas appliances ◆ Understand typical terms of the gas industry

	<ul style="list-style-type: none"> ◆ Understand commonly used in the gas industry metrology units ◆ Simple conversion of different commonly used in the gas industry metrology units <p>6.2 Basic Professional knowledge and responsibilities in gas application</p> <ul style="list-style-type: none"> ◆ Know about the development process and history of the Gas Safety Ordinance Cap. 51 of Hong Kong ◆ Understand the Gas Safety Ordinance Cap. 51 ◆ Understand the codes of practice issued by the Gas Standards Office (GasSO) of the Electrical and Mechanical Services Department ◆ Understand other relevant standards and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Possess basic knowledge of the composition, properties and manufacturing and production process of Towngas, liquefied petroleum gas (LPG) and natural gas as well as the requirements of gas ordinances and codes of practice; be capable to apply the knowledge in gas related works; and be capable to understand typical terms of the gas industry.</p>
8. Remarks	<p>This unit of competency provides basic knowledge of the gas industry, and all new entrants are recommended to learn this unit first.</p>

1. Title	Use typical electrical meters	
2. Code	EMCUDE101A	
3. Range	With regard to electrical and mechanical engineering services, have basic understanding in electrical terms, units and calculations, and electrical components; and use typical electrical meters for general measurement.	
4. Level	1	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Basic electrical concepts</p> <ul style="list-style-type: none"> ◆ Understand basic electrical concepts, including: <ul style="list-style-type: none"> • Stating briefly the names and uses of common electrical components from distribution board to all final circuits • Distinguish and apply basic electrical terms such as electric current, electric voltage, electric resistance, electric energy and electric power, etc., and their basic units and calculations ◆ Understand the working principles of common meters, including: <ul style="list-style-type: none"> • Structure and working principles of moving coil, moving iron and electric meter • Uses and the pros and cons of the above three types of meters • Structure, working principles and uses of traditional multimeter ◆ Understand the code of safety and operation for using common meters <p>6.2 Use of meters</p> <ul style="list-style-type: none"> ◆ Use typical meters <ul style="list-style-type: none"> • Capable to use multimeters safely and correctly to measure electric current, electric voltage and electric resistance of simple circuits 	

	<ul style="list-style-type: none"> • Capable to use appropriate common meters safely and correctly to measure electric energy (kWH) and electric power (kW) • Know how to maintain typical meters
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to use multimeters to measure electric current, electric voltage and electric resistance of simple circuits according to the code of safety and operation, and make simple calculations of electricity; and</p> <p>(ii) Capable to use appropriate typical meters to measure electric energy and electric power of simple circuits according to the code of safety and operation.</p>
8. Remarks	This unit of competency is applicable to new entrants of electrical and mechanical engineering services.

1. Title	Identify general properties of different types of typical electrical and mechanical engineering materials
2. Code	EMCUDE109A
3. Range	Capable to identify the general properties and range of application of different types of typical electrical and mechanical engineering materials for electrical and mechanical design, installation, repair and maintenance.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 General properties of typical electrical and mechanical engineering materials</p> <ul style="list-style-type: none"> ◆ Understand the general properties of typical electrical and mechanical engineering materials including metals and non-metals: <ul style="list-style-type: none"> • Mechanical properties such as strength, hardness, resilience, etc. • Density • Electric conductivity • Thermal conductivity • Melt ability <p>6.2 Identify properties and range of application of typical electrical and mechanical engineering materials</p> <ul style="list-style-type: none"> ◆ Capable to identify different types of typical electrical and mechanical engineering materials, including metal type: steel, copper, aluminium, iron, etc., and non-metal type: wood, plastic, resin, etc. ◆ Capable to identify basic range of application of different types of typical electrical and mechanical engineering materials ◆ Capable to perform simple design, installation, repair and maintenance engineering works according to the general properties and range of application of different types of typical electrical and mechanical engineering materials

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to identify the general properties and range of application of different types of typical electrical and mechanical engineering materials.
8. Remarks	This unit of competency is applicable to new entrants of electrical and mechanical engineering services.

1. Title	Apply basic bench fitting techniques and use small typical hand tools
2. Code	EMCUIN106A
3. Range	Apply basic bench fitting techniques, including marking, sawing, filing, grinding, drilling and chiseling, in tasks of production, installation and maintenance and repairs for electrical and mechanical works.
4. Level	1
5. Credit	9
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Know about basic bench fitting techniques and small typical hand tools</p> <ul style="list-style-type: none"> ◆ Understand basic bench fitting techniques, including marking, sawing, filing, grinding, drilling and chiselling ◆ Understand the operation of small typical hand tools, including cutting tools, measuring instruments, files, assembling and dismantling tools, marking-out tools, portable power drills, drilling machines, and relevant concerns <p>6.2 Apply basic bench fitting techniques and small typical hand tools in tasks of production, installation and maintenance and repairs</p> <ul style="list-style-type: none"> ◆ Understand the correct use of small typical hand tools <ul style="list-style-type: none"> • Capable to use various types of cutting tools correctly, such as bow saws and shears • Capable to use metric and imperial measuring instruments correctly, such as steel rules, venires, inside callipers and outside callipers • Capable to use steel rules and beam squares to measure the length and to check horizontal, vertical and curved surfaces correctly • Capable to select and use files correctly, such as single cut files, flat files, round files, half-round files, triangular files, double cut files, rough-cut and smooth files of different degree of fineness • Capable to select and use scrapers correctly

	<ul style="list-style-type: none"> • Capable to use assembling and dismantling tools correctly, such as open-ended spanners, adjustable spanners, box spanners, hexagon ring spanners, screw drivers, jaw vices, hand vices and hammers, to assemble or dismantle simple mechanical devices • Capable to use various types of marking-out tools correctly, such as line needle, hook needle, centre punches, pin punches and dividers • Capable to use portable power drills and drilling machines correctly ◆ Apply basic bench fitting techniques and use small typical hand tools <ul style="list-style-type: none"> • Identify and select common metals <ul style="list-style-type: none"> ▸ Capable to identify various types of common metals ▸ Capable to select suitable common metals according to uses • Capable to apply basic bench fitting techniques, including marking, sawing, filing, grinding, drilling and chiselling, to trim materials, to measure work pieces and to make metal work pieces to required dimensions, according to templates or simple drawings <p>6.3 Code of practice for bench fitting ◆ Capable to use small typical hand tools and bench fitting techniques in completing tasks of production, installation, maintenance and repairs according to the code of safety</p>
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7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to make metal pieces to required dimensions according to templates or simple drawings; apply the techniques of marking, sawing, filing, grinding, drilling and chiseling in tasks of production, installation, maintenance and repairs; capable to observe the code of safety.
8. Remarks	This unit of competency is applicable to new entrants of the electrical and mechanical trade.

1. Title	Identify different types of pipe materials and their range of application
2. Code	EMCUIN109A
3. Range	Capable to identify different types of pipe materials and their range of application in general industrial plants, power plants, and workplaces where ship engineering, fire engineering, plumbing or gas engineering is involved.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Pipe materials and their range of application</p> <ul style="list-style-type: none"> ◆ Understand different types of pipe materials, such as: <ul style="list-style-type: none"> • Cast iron • Low-carbon steel • Stainless steel • Copper • Aluminium • Plastic ◆ Understand the properties of different types of pipe materials, such as: <ul style="list-style-type: none"> • Bend ability • Pressure resistance • Heat resistance • Resilience • Weldability • Corrosion resistance ◆ Understand the characteristics of pipeline manufacturing <ul style="list-style-type: none"> • Casting • Plastic moulding • Lining • Electric welding • Seamless • Continuous welding, etc. ◆ Understand the range of application of different types of pipes

	<p>6.2 Identify the application of different types of pipes</p> <p>◆ Identify the properties and range of application of different types of pipe materials for general pipe installation</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Identify the properties and range of application of different types of pipe materials for general pipe installation.</p>
8. Remarks	<p>This unit of competency is applicable to new entrants of electrical and mechanical engineering services.</p>

1. Title	Refuel LPG vehicle, operate dispenser and related gas supply system	
2. Code	EMGAOR101A	
3. Range	Master the operation of dispenser and related equipment, and refuel LPG vehicles safely at an LPG filling station.	
4. Level	1	
5. Credits	7	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of refueling LPG vehicles and operating dispenser and gas supply system</p> <ul style="list-style-type: none"> ◆ Identify gas leakage and implement handling procedures ◆ Identify the smell of LPG ◆ Understand how to avoid frostbite <p>6.2 Methods and procedures of refueling LPG vehicles and operating dispenser and gas supply system</p> <ul style="list-style-type: none"> ◆ Understand the work flow of gas supply system in a LPG filling station ◆ Understand the function and correct operation of an emergency shut-down buttons ◆ Understand the function of a gas detector and read the readings correctly ◆ Understand the function and correct operation of a control panel of dispensing system ◆ Understand the function of a LPG storage tank and read the LPG storage level of the tank correctly ◆ Understand the operation of a dispenser: <ul style="list-style-type: none"> • Connect and disconnect the nozzle with the LPG vehicle body correctly • Set the procedures of LPG filling level and fees charging correctly 	

	<p>6.3 Professional knowledge and responsibilities for refueling LPG vehicle and operating dispenser and gas supply system</p> <ul style="list-style-type: none"> ◆ Understand the functions of major components and parts of the LPG vehicle tank ◆ Operate the inlet and outlet valves of the LPG vehicle correctly ◆ Complete the filling procedures according to company guidelines and safety requirements
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to refuel LPG vehicles safely at an LPG filling station.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Operate LPG cylinder filling system	
2. Code	EMGAOR102A	
3. Range	Carry out daily operation of the LPG cylinder filling system in the LPG compound.	
4. Level	1	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of operating LPG cylinder filling system</p> <ul style="list-style-type: none"> ◆ Understand the work flow of LPG cylinder filling system ◆ Understand the purpose and correct steps of using seals ◆ Understand the purpose and correct operation of platform scale ◆ Understand the meanings of markings on LPG cylinders ◆ Understand the purpose and correct operation of gas filling platform <p>6.2 Methods and procedures of operating LPG cylinder filling system</p> <ul style="list-style-type: none"> ◆ Classify LPG cylinders systematically and store them properly at suitable locations ◆ Conduct soundness test correctly for the LPG cylinders ◆ Carry out the whole gas filling process correctly for the LPG cylinders <p>6.3 Professional knowledge and responsibilities for operating LPG cylinder filling system</p> <ul style="list-style-type: none"> ◆ Understand the explosion-proof standard requirements in LPG compounds 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to operate the LPG cylinder filling system in the LPG compound.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Work at LPG filling stations	
2. Code	EMGASH101A	
3. Range	Carry out LPG related work safely at LPG filling stations.	
4. Level	1	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of working safely at LPG filling station</p> <ul style="list-style-type: none"> ◆ Understand the effects of the LPG properties on filling station ◆ Understand how to avoid frostbite caused by LPG ◆ Understand industrial safety knowledge relevant to LPG filling station ◆ Understand general fire safety knowledge ◆ Understand the basic principles of explosion-proof. ◆ Understand and implement safety guidelines ◆ Understand the meanings of different traffic signs <p>6.2 Methods and procedures of working safely at LPG filling station</p> <ul style="list-style-type: none"> ◆ Use dry powder fire extinguisher correctly to put out small fire ◆ Identify the smell of LPG ◆ Handle general leakage correctly to minimize the influence on users ◆ Push the emergency shut-down button correctly to inform the management and minimize the influence ◆ Confirm and silence the alarm of gas detector correctly ◆ Close the appropriate valves correctly ◆ Evacuate the public of the surrounding area correctly ◆ Promptly inform the superior and report to the police after the accident has happened 	

	<p>6.3 Professional knowledge and responsibilities for working safely at LPG filling station</p> <p>◆ Apply relevant gas safety regulations and codes of practice</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to work safely at LPG filling stations and handle general emergencies correctly.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Work safely at construction sites
2. Code	EMGASH102A
3. Range	Perform gas related installation and commissioning works safely at building sites and aboveground construction sites.
4. Level	1
5. Credits	4
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of working safely at construction sites</p> <ul style="list-style-type: none"> ◆ Have general safety knowledge of the construction industry such as: <ul style="list-style-type: none"> • General introduction to the Factories and Industrial Undertakings Ordinance and the Occupational safety Ordinance • Construction Sites (Safety) Regulations • Ordinances relevant to the general duties for employers and employees • Work safety concepts • Wearing personal protective equipment • Accident prevention and safety at work • Handling of emergencies • Report of hazardous incidents • Contingency plans ◆ Have knowledge of safety in confined spaces such as: <ul style="list-style-type: none"> • Types of confined spaces • Relevant legal requirements and code of practice • Potential hazards in confined spaces and their causes • Work safety procedures and protective measures • Risk assessment and work permit systems • Introduction to the use of gas detection instruments

	<ul style="list-style-type: none"> • Personal protective equipment and first aid • Case studies and hands-on practice in the use of rescue equipment ◆ Know about industrial safety knowledge relevant to construction site ◆ Know about the safety principles of pipework production ◆ Know about the safety principles of using gas ◆ Master safety knowledge relevant to excavation work ◆ Understand related underground public facilities <p>6.2 Methods and procedures of working safely at construction sites</p> <ul style="list-style-type: none"> ◆ Select, wear and maintain personal protective equipment correctly ◆ Point out the potential hazards at the work place
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform gas related installation and commissioning works safely at building sites and aboveground construction sites.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Work safely at LPG compounds
2. Code	EMGASH103A
3. Range	Perform LPG related works safely at LPG compounds.
4. Level	1
5. Credits	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of working safely at LPG compounds</p> <ul style="list-style-type: none"> ◆ Understand how to avoid frostbite caused by LPG ◆ Know about industrial safety knowledge of LPG compounds ◆ Understand the safety requirements on LPG compounds ◆ Understand and implement safety guidelines ◆ Understand the basic principles of explosion-proof ◆ Master general fire safety knowledge ◆ Use dry powder fire extinguisher correctly <p>6.2 Methods and procedures of working safely at LPG compounds</p> <ul style="list-style-type: none"> ◆ Select, wear and maintain personal protective equipment correctly ◆ Follow the fire escape route correctly to the assembling place ◆ Handle LPG leakage correctly and inform persons in charge to follow up <p>6.3 Professional knowledge and responsibilities for working safely at LPG compounds</p> <ul style="list-style-type: none"> ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform LPG related works safely at LPG compounds.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Use general personal protective equipment	
2. Code	EMCUSH108A	
3. Range	Use general personal protection device correctly at electrical and mechanical work sites to protect personal safety and health.	
4. Level	1	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Various types of personal protective equipment</p> <ul style="list-style-type: none"> ◆ Understand the types, utilization, maintenance and limitations of personal protection device such as safety belt, eye protector, safety shoes, insulating gloves, protective guard, helmet and ear plug, etc. ◆ Understand the basic maintenance of personal protective equipment <p>6.2 Use of personal protective equipment</p> <ul style="list-style-type: none"> ◆ Capable to use general personal protection device such as safety belt, eye protector, safety shoes, insulating gloves, protective guard, helmet and ear plug, etc. ◆ Capable to choose and use general personal protection device correctly by following systematic safety procedures for the best protection ◆ Capable to use and maintain personal protection device correctly according to safety guidelines and procedures so as to comply with the law 	

7. Assessment Criteria	The integrated outcome requirements of this unit of competency are: (i) Capable to understand various types of personal protection device and their limitations; (ii) Capable to choose and use general personal protection device correctly; and (iii) Capable to use and maintain personal protection device correctly in daily working environment according to safety guidelines and procedures so as to comply with the law.
8. Remarks	This unit of competency is applicable to electrical and mechanical practitioners in general.

1. Title	Perform manual handling operation
2. Code	EMCUSH109A
3. Range	Apply the correct way of manual lifting and handling at electrical and mechanical work sites to avoid bodily injuries.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Correct way of manual lifting and handling</p> <ul style="list-style-type: none"> ◆ Understand the effects of incorrect lifting and handling, including: <ul style="list-style-type: none"> • The impact on the waist and the back • Causes of manual lifting injuries • Basic knowledge of waist and back care <p>6.2 Application of the correct way of manual lifting and handling</p> <ul style="list-style-type: none"> ◆ Capable to apply the way of manual lifting and handling correctly and properly to avoid bodily injuries ◆ Capable to implement the recommendations of the risk assessment for the manual handling operation
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to illustrate the importance of applying the correct way of manual lifting and handling so as to avoid bodily injuries; and</p> <p>(ii) Capable to apply the correct way of manual lifting and handling for materials that need to be handled manually in routine operation.</p>
8. Remarks	This unit of competency is applicable to frontline electrical and mechanical practitioners in general.

1. Title	Safety operation in confined spaces
2. Code	EMCUSH110A
3. Range	Apply the basic knowledge of safety operation in confined spaces and understand the hazards when working in confined spaces so as to prevent accidents.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Basic knowledge of safety operation in confined spaces</p> <ul style="list-style-type: none"> ◆ Understand potential hazards and causes for working in confined spaces, including explosion, fire, anoxia, poisonous gas, etc. ◆ Understand the types of confined spaces and relevant legal requirements ◆ Understand the safety procedures, including the use of general protective equipment, for working in confined spaces <p>6.2 Basic safety for working in confined spaces</p> <ul style="list-style-type: none"> ◆ Possess basic safety knowledge of carrying out electrical and mechanical engineering works in confined spaces ◆ Capable to work in confined spaces according to safety procedures, preventive measures of working in confined spaces and relevant legal requirements
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to work in confined spaces according to safety procedures, preventive measures of working in confined spaces and relevant legal requirements.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic safety knowledge.

1. Title	Comply with the legal requirements on electrical and mechanical occupational safety and health	
2. Code	EMCUSH111A	
3. Range	Comply with the codes of practice and legal requirements on occupational safety and health when working at electrical and mechanical work sites.	
4. Level	1	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Codes of practice and ordinances for occupational safety and health</p> <ul style="list-style-type: none"> ◆ Understand the requirements for site workers imposed by the codes of practice and ordinances for occupational safety and health, and how to ensure personal occupational safety with correct working procedures. These codes and ordinances include: <ul style="list-style-type: none"> • Occupational Safety and Health ordinance and Regulations • Factories and Industrial Undertakings Ordinance and Regulations • Factories and Industrial Undertakings (Electricity) Regulations • Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations <p>6.2 Comply with codes of practice and ordinances for occupational safety and health</p> <ul style="list-style-type: none"> ◆ Capable to comply with the legal requirements on occupational safety and health to carry out routine, repetitive or clearly defined electrical and mechanical engineering work safely 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to understand the requirements for site workers imposed by the codes of practice and ordinances for occupational safety and health; and to carry out routine, repetitive or clearly defined electrical and mechanical engineering work with proper working procedures.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic safety knowledge.

1. Title	Comply with the legal requirements on environmental protection
2. Code	EMCUSH112A
3. Range	Comply with the legal requirements on environmental protection when working at electrical and mechanical work sites.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Environmental protection legislations</p> <ul style="list-style-type: none"> ◆ Understand the legal requirements for electrical and mechanical engineering work on environmental protection, such as: <ul style="list-style-type: none"> • Noise Control Ordinance • Waste Disposal Ordinance • Water Pollution Control Ordinance • Ozone Layer Protection Ordinance • Dumping at Sea Ordinance • Air Pollution Control Ordinance <p>6.2 Application of environmental protection legislations</p> <ul style="list-style-type: none"> ◆ Capable to comply with the legal requirements on environmental protection to carry out routine, repetitive or clearly defined electrical and mechanical engineering work
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to comply with the legal requirements on environmental protection to carry out routine, repetitive or clearly defined electrical and mechanical engineering work with correct working procedures.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses general awareness of environmental protection.

1. Title	Handle general chemicals safely
2. Code	EMCUSH113A
3. Range	Capable to handle general chemicals safely in workshops or work sites, and understand the hazards and preventive measures for these chemicals so as to protect oneself and other people during daily operation or accident happened.
4. Level	1
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge of handling general chemicals safely in workshops or work sites</p> <ul style="list-style-type: none"> ◆ Possess basic knowledge of handling chemicals safely, including: <ul style="list-style-type: none"> • Hazards of chemicals • Labelling of chemicals • Ways of chemicals entering human bodies • Safety measures for handling chemicals • Personal protective equipment • Compliance of contingency measures ◆ Understand the classification of general chemical substances, including: <ul style="list-style-type: none"> • Explosive substance • Flammable substance • Strong supporter of combustion • Gas • Harmful or poisonous substance • Organic solvent • Corrosive fluid <p>6.2 Way of handling general chemicals</p> <ul style="list-style-type: none"> ◆ Handle chemicals correctly and prevent chemical hazards, including making use of personal protection device ◆ Capable to prevent occupational health hazards caused by chemicals

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to handle general chemicals safely and prevent chemical hazards.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of occupational safety and health.

Competency Level 2

1. Title	Design installation work for gas pipes, appliances, meters and relevant facilities in domestic premises
2. Code	EMGADE201A
3. Range	Design gas installation work for customers in a cost-effective way for domestic premises already built according to customers' needs as well as the requirements of the gas safety regulations and codes of practice; take the initiative to accomplish the design task independently and brief the engineering personnel or people concerned on the engineering details; and provide special solutions for non-routine engineering environment.
4. Level	2
5. Credits	4
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installation design for gas pipes, appliances, meters and relevant facilities in domestic premises</p> <ul style="list-style-type: none"> ◆ Use typical symbols for the gas industry ◆ Explain correctly the specifications of various types of gas appliances and their installation requirements ◆ Understand the specifications and correct match of gas pipes, appliances, meters and relevant facilities ◆ Calculate the total gas consumption and power of gas appliances correctly ◆ Point out the correct way to protect the exposed pipes ◆ Point out the correct way to protect the concealed pipes ◆ Point out correctly the requirements on pipes for passing through floor slabs and walls

	<p>6.2 Methods and procedures of installation design for gas pipes, appliances, meters and relevant facilities in domestic premises</p> <p>6.3 Professional knowledge of installation design for gas pipes, appliances, meters and relevant facilities in domestic premises</p>	<ul style="list-style-type: none"> ◆ Accurately estimate, and measure at the work site, dimensions of the pipes or the works area ◆ Select suitable meters correctly ◆ Select pressure regulators with suitable gas flow rate and inlet and outlet pressure ◆ Select relevant facilities correctly ◆ Use graphical tools to find out the gas flow rate of pipes ◆ Draw the working drawing clearly ◆ Use typical symbols for the gas industry ◆ Point out the correct location of pipe support <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice GU03 on [Installation Requirements for Domestic Gas Water Heaters] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design and make suitable decision on the pipe route, the location of gas appliances to be installed, pipe diameter, meter and relevant facilities.</p>	
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>	

1. Title	Use computer to draw mechanical drawings
2. Code	EMCUDE212A
3. Range	Use typical computer software to draw mechanical drawings for electrical and mechanical work according to design.
4. Level	2
5. Credit	8
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Computer drawing techniques and methods</p> <ul style="list-style-type: none"> ◆ Understand the computer drawing techniques and methods, including the knowledge of drawing specifications, machinery to be drawn and pneumatic symbols <p>6.2 Application of computer drawing</p> <ul style="list-style-type: none"> ◆ Use the computer to set the drawing specifications <ul style="list-style-type: none"> • Set the drawing specifications • Use all types of lines, layers and typeface • Open and save file ◆ Use the computer to draw geometric figures, including mechanical and pneumatic symbols ◆ Use the computer to draw mechanical drawings according to design <ul style="list-style-type: none"> • Draw mechanical layouts • Draw projected mechanical parts • Draw sectional views for mechanical parts ◆ Use the computer to draw the pneumatic system according to design <ul style="list-style-type: none"> • Draw the pneumatic system's layout according to the pneumatic design • Draw the electric control circuit of the pneumatic system according to the circuit design

7. Assessment Criteria	The integrated outcome requirements of this unit of competency are: (i) Capable to use computer to draw mechanical layouts, projection and sectional views of mechanical equipment and parts according to design; and (ii) Capable to use computer to draw the pneumatic control layouts for a whole pneumatic system unit of an industrial plant with general requirements and specifications according to design.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic computer knowledge.

1. Title	Install and test supply system and ancillary systems in LPG filling station	
2. Code	EMG AIT201A	
3. Range	Install and test LPG filling systems and equipment in general LPG filling stations, including dispenser, LPG pump, dispensing system control panel, pneumatic control system and emergency shut-down system.	
4. Level	2	
5. Credits	9	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and testing supply system and ancillary system in LPG filling station</p> <ul style="list-style-type: none"> ◆ Use multi-meter correctly to measure the resistance, current and voltage of circuit ◆ Use clamp type ammeter correctly to measure current of power line ◆ Use insulation meter to measure insulation resistance of power line ◆ Use phase meter correctly to measure phase sequence of the three-phase power source ◆ Identify general circuit components and know their functions ◆ Understand the pneumatic control principles ◆ Understand the emergency shut-down system ◆ Understand the system and operation flow of filling station ◆ Understand the basic principles of explosion-proof standards <p>6.2 Methods and procedures of installing and testing supply system and ancillary system in LPG filling station</p> <ul style="list-style-type: none"> ◆ Follow the manufacturer's and technical instructions to install equipment to meet the explosion-proof specifications ◆ Follow the manufacturer's and technical instructions correctly to install the LPG pump ◆ Follow the manufacturer's and technical instructions correctly to install the dispenser 	

	<ul style="list-style-type: none"> ◆ Follow the manufacturer's and technical instructions correctly to operate the dispenser ◆ Follow the manufacturer's and technical instructions correctly to install pipes and valves of the pneumatic system ◆ Follow the manufacturer's and technical instructions correctly to test the pneumatic system ◆ Follow the manufacturer's and technical instructions correctly to install the emergency shut-down buttons ◆ Follow the manufacturer's and technical instructions correctly to test the emergency shut-down system ◆ Follow the manufacturer's and technical instructions correctly to install and test the pneumatic system control panel <p>6.3 Professional knowledge and responsibilities for installing and testing supply system and ancillary system in LPG filling station</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 2 [Underground LPG Pipework] ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 4 [Aboveground Distribution Pipes, Service Risers, Downers and Ring Mains] ◆ Apply other gas related regulations and codes of practice
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7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install and test the supply system and ancillary systems in a LPG filling station.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Perform pressure tests, purging and commissioning for installation pipes, service pipes and relevant equipment	
2. Code	EMGAIT202A	
3. Range	Perform pressure tests, purging and commissioning for installation pipes, service pipes and relevant equipment in general domestic, commercial and industrial premises.	
4. Level	2	
5. Credits	9	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of pressure tests, purging and commissioning of installation pipes, service pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ List gas leakage handling methods commonly used in Hong Kong ◆ List safety concerns for using gaseous fuel (including Towngas, LPG and NG) in Hong Kong ◆ List the minimum requirements for working in construction sites ◆ List soundness test procedures for major systems ◆ Calculate the total volume of the system correctly <p>6.2 Methods and procedures of pressure tests, purging and commissioning of installation pipes, service pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Understand the location of the piping route in the working drawing ◆ Count the number and quantities of parts and pipes used from the working drawing ◆ List how to protect gas pipes during construction ◆ Implement soundness test procedures correctly ◆ Calculate leakage volume according to the test result and make improvements and corrections accordingly ◆ List various commissioning methods and their characteristics, and make correct choices ◆ Implement commissioning procedures correctly ◆ Illustrate and report the soundness test results correctly 	

	<p>6.3 Professional knowledge and responsibilities for pressure tests, purging and commissioning of installation pipes, service pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice ◆ List the code of operation according to the gas safety regulation, Code of practice and guidelines ◆ Understand relevant codes of practice and implement properly in the work site ◆ List possible dangers during commissioning and their solutions
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform pressure tests, purging and commissioning for installation pipes, service pipes and relevant equipment in general domestic, commercial and industrial premises.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install and lay gas mains (electro fusion method)	
2. Code	EMGAIT203A	
3. Range	Use electro fusion method to install and lay polyethylene (PE) gas mains in general road environment.	
4. Level	2	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and laying gas mains (electro fusion method)</p> <ul style="list-style-type: none"> ◆ Understand the properties and range of application of PE gas mains ◆ Operate diesel power generator correctly ◆ Operate pneumatic tools correctly ◆ Distinguish different public utilities ◆ Understand underground public utilities plans ◆ Know about the requirements for working in confined spaces ◆ Work safely in trenches underground <p>6.2 Methods and procedures of installing and laying gas mains (electro fusion method)</p> <ul style="list-style-type: none"> ◆ Use the electro fusion method and relevant equipment correctly to connect PE pipes ◆ Set appropriate safety distance, pipe depth and locations for installation according to properties of soil aboveground and underground and surrounding pipework conditions ◆ Select suitable pipe support and protective measures according to the design and individual environment in application ◆ Explain the working drawing of the gas network clearly and put on record the work completed 	

	<p>6.3 Professional knowledge and responsibilities for installing and laying gas mains (electro fusion method)</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation ◆ Apply the industrial safety knowledge relevant to gas main laying works
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to use electro fusion method to install and lay polyethylene (PE) gas mains in general road environment.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install and connect hotplate to LPG cylinder	
2. Code	EMGAI204A	
3. Range	Use suitable materials and processes to install and connect hotplates to LPG cylinders in domestic premises, and perform testing and commissioning for them.	
4. Level	2	
5. Credits	7	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of hotplate installation and connection to LPG cylinder</p> <ul style="list-style-type: none"> ◆ List and explain the structure of LPG cylinder ◆ List the requirements of storage of LPG cylinder ◆ List the methods of handling LPG cylinder leakage ◆ List the installation procedures ◆ List the inspection and testing items needed and the legal requirements ◆ List the instruction of using hotplate and the gas related safety concerns ◆ List the operating principles and key points of using different pressure gauges ◆ List the pipe connection standards and requirements <p>6.2 Methods and procedures of hotplate installation and connection to LPG cylinder</p> <ul style="list-style-type: none"> ◆ List the structure of LPG cylinder regulator ◆ List the operating principles of LPG cylinder regulator ◆ List common faults of LPG cylinder regulator and related remedial actions ◆ Identify gas leakage ◆ Use leak detection liquid to find out the leakage position ◆ Identify qualified and suitable gas tubing for use ◆ List and report on the operation condition of the hotplate according to the gas safety regulation and code of practice 	

	<ul style="list-style-type: none"> ◆ Identify the combustion condition of the hotplate and make adjustments and improvements accordingly ◆ Decide whether the hotplate is suitable for further use and explain to the customer <p>6.3 Professional knowledge and responsibilities for hotplate installation and connection to LPG cylinder</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU01 on [Approval of Flexible Gas Tubing for Low Pressure Applications] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU05 on [Approval of Domestic Gas Appliances] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU09 on [Low Pressure Regulators for Supplying Gas from LPG Cylinders Having Less Than 40 Litres Water Capacity] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to use suitable materials and processes to install and connect hotplates to LPG cylinders in domestic premises, and perform testing and commissioning for them.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install domestic flued gas appliances	
2. Code	EMGAIT205A	
3. Range	Use suitable materials and processes to install and commission flue gas appliances in domestic premises.	
4. Level	2	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and commissioning domestic flue gas appliances</p> <ul style="list-style-type: none"> ◆ Locate the installation position of flued gas appliances according to the working drawing ◆ Inspect associated construction works of flue terminal installation, and exhaust facilities and safety distance required ◆ List out points to note for using flued gas appliances ◆ List out points for customers to take for not using the flued gas appliances for a long period of time ◆ List the definition of unsafe gas appliance ◆ List positions and environments not suitable for flued gas appliance and flue duct installation ◆ List the safety distance between the flued gas appliance/flue duct and surrounding devices ◆ Know the colour code of wire, and list the differences of line, neutral wire and earth wire <p>6.2 Methods and procedures of installing and commissioning domestic flue gas appliances</p> <ul style="list-style-type: none"> ◆ Highlight to the user the noting points for the use and maintenance of the appliance ◆ Install the appliance and flue correctly and properly ◆ Connect the wire to the socket correctly ◆ Check the continuity of wire 	

	<ul style="list-style-type: none"> ◆ Check the operation of the appliance correctly ◆ Judge the combustion situation of the appliance correctly ◆ Perform soundness test for the appliance and connected fittings correctly ◆ Analyze the faults and their remedial actions <p>6.3 Professional knowledge and responsibilities for installing and commissioning domestic flue gas appliances</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the code of practice GU03 on [Installation Requirements for Domestic Gas Water Heaters] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU05 on [Approval of Domestic Gas Appliances] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to use suitable materials and processes to install and commission flue gas appliances in domestic premises.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAIT206A 【Install domestic flueless gas appliances】 .</p>

1. Title	Install domestic flueless gas appliances	
2. Code	EMGAIT206A	
3. Range	Use suitable materials and processes to install and commission flueless gas appliances in domestic premises.	
4. Level	2	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and commissioning domestic flueless gas appliances</p> <ul style="list-style-type: none"> ◆ List out points to note for using flueless gas appliances ◆ Brief users on the noting points for the use and maintenance of the appliances ◆ List out steps for customers to take for not using the appliances for a long period of time ◆ List the definition of unsafe gas appliance ◆ List positions and environments not suitable for flueless gas appliance installation ◆ Know the colour code of wire, and list the differences of line, neutral wire and earth wire <p>6.2 Methods and procedures of installing and commissioning domestic flueless gas appliances</p> <ul style="list-style-type: none"> ◆ Determine the safety distance between the appliance installation and surrounding devices ◆ Install the appliance correctly and properly ◆ Connect the wire to the socket correctly ◆ Check the continuity of wire ◆ Check the functions and operation of the appliance correctly ◆ Judge the combustion situation of the appliance correctly ◆ Perform soundness test for the appliance and connected fittings correctly ◆ Analyze the faults and their remedial actions 	

	<p>6.3 Professional knowledge and responsibilities for installing and commissioning domestic flueless gas appliances</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice GU03 on [Installation Requirements for Domestic Gas Water Heaters] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU05 on [Approval of Domestic Gas Appliances] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to use suitable materials and processes to install and commission flueless gas appliances in domestic premises.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install indoor domestic gas pipes and relevant equipment	
2. Code	EMGAIT207A	
3. Range	Install indoor gas pipes and relevant equipment in general domestic premises according to specified accuracy and requirements of the industry.	
4. Level	2	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing indoor domestic gas pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Explain and use typical drawing symbols correctly ◆ Read out the measurements correctly ◆ Identify different piping materials ◆ Convert metric units correctly to units commonly used in the industry <p>6.2 Methods and procedures of installing indoor domestic gas pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Choose correct piping materials, protective materials and sealing materials according to different application environments ◆ Choose correct pipe fittings according to different application environments ◆ Draw pipework layout plan correctly and to scale ◆ Choose suitable soundness test methods according to different application environments ◆ Choose suitable testing pressure ◆ Complete the test and report on the results <p>6.3 Professional knowledge and responsibilities for installing indoor domestic gas pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice ° 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install indoor gas pipes and relevant equipment in general domestic premises according to specified accuracy and requirements of the industry.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Install indoor commercial and industrial gas pipes and relevant equipment	
2. Code	EMGAIT208A	
3. Range	Install indoor gas pipes and relevant equipment in general commercial and industrial premises according to specified accuracy and requirements of the industry.	
4. Level	2	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing indoor commercial and industrial gas pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Explain and use typical drawing symbols correctly ◆ Point out the range of application of typical piping materials and different fittings ◆ Draw pipework layout plan correctly and to scale ◆ Use tools and instruments correctly to connect underground pipes ◆ Use different connection methods ◆ Choose suitable soundness test methods according to different application environments ◆ Choose suitable testing pressure ◆ Complete the test and report on the results ◆ Connect the pipe and relevant equipment by flange joints <p>6.2 Professional knowledge and responsibilities for installing indoor commercial and industrial gas pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Gas Utilisation Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply other gas related regulations and codes of practice 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install indoor gas pipes and relevant equipment in general commercial and industrial premises according to specified accuracy and requirements of the industry.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Install gas mains (steel pipes)	
2. Code	EMGAIT209A	
3. Range	Install and lay steel gas mains in general road environment.	
4. Level	2	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing gas mains (steel pipes)</p> <ul style="list-style-type: none"> ◆ Understand the properties and range of application of steel pipes ◆ Operate diesel power generator correctly ◆ Operate pneumatic tools correctly ◆ Distinguish different public utilities ◆ Understand underground public utilities plans ◆ Know about the requirements for working in confined spaces ◆ Work safely in trenches underground <p>6.2 Methods and procedures of installing gas mains (steel pipes)</p> <ul style="list-style-type: none"> ◆ Set appropriate safety distance, pipe depth and locations for installation according to the properties of soil aboveground and underground and surrounding pipework conditions ◆ Select suitable pipe support and protective measures according to the design and individual environment in application ◆ Use suitable techniques to weld the steel pipes correctly ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed <p>6.3 Professional knowledge and responsibilities for installing gas mains (steel pipes)</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation ◆ Apply the industrial safety knowledge relevant to gas main laying works 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install and lay steel gas mains in general road environment.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Install and lay gas mains (ductile iron pipes)	
2. Code	EMGAI210A	
3. Range	Install and lay ductile iron gas mains in general road environment.	
4. Level	2	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing gas mains (ductile iron pipes)</p> <ul style="list-style-type: none"> ◆ Understand the properties and range of application of ductile iron pipes ◆ Use suitable techniques and sealing materials to connect ductile iron pipes ◆ Operate air compressor correctly ◆ Operate diesel power generator correctly ◆ Operate pneumatic tools correctly ◆ Distinguish different public utilities ◆ Understand underground public utilities plans ◆ Know about the requirements for working in confined spaces ◆ Work safely in trenches underground <p>6.2 Methods and procedures of installing gas mains (ductile iron pipes)</p> <ul style="list-style-type: none"> ◆ Set appropriate safety distance, pipe depth and locations for installation according to the properties of soil aboveground and underground and surrounding pipework conditions ◆ Select suitable pipe support and protective measures according to the design and individual environment in application ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed 	

	<p>6.3 Professional knowledge and responsibilities for installing gas mains (ductile iron pipes)</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation ◆ Apply the industrial safety knowledge relevant to gas main laying works
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install and lay ductile iron gas mains in general road environment.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install domestic and commercial and industrial gas service pipes and relevant equipment
2. Code	EMGAIT211A
3. Range	Install domestic and commercial and industrial gas service pipes and relevant equipment in general domestic and commercial and industrial premises according to specified accuracy and requirements of the industry.
4. Level	2
5. Credits	5
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing domestic and commercial and industrial gas service pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Convert metric units correctly to units commonly used in the industry ◆ Explain and use typical drawing symbols correctly ◆ Draw pipework layout plan correctly and to scale ◆ Read out the measurements correctly ◆ Identify different piping materials <p>6.2 Methods and procedures of installing domestic and commercial and industrial gas service pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Choose correct piping materials, protective materials and sealing materials according to different application environments ◆ Choose correct pipe fittings according to different application environments ◆ Choose suitable soundness test methods according to different application environments ◆ Choose suitable testing pressure ◆ Complete the test and report on the results ◆ Use welding method to connect the pipes ◆ Connect the pipe and relevant equipment by flange joints ◆ Install 2nd stage regulator at roof correctly ◆ Install expansion joints correctly ◆ Install insulated socket correctly

	<p>6.3 Professional knowledge and responsibilities for installing domestic and commercial and industrial gas service pipes and relevant equipment</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install domestic and commercial and industrial gas service pipes and relevant equipment in general domestic and commercial and industrial premises according to specified accuracy and requirements of the industry.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install and lay gas mains (automatic butt fusion method)	
2. Code	EMGAIT212A	
3. Range	Install and lay PE gas mains in general road environment.	
4. Level	2	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and laying gas mains (automatic butt fusion method)</p> <ul style="list-style-type: none"> ◆ Understand the properties and range of application of PE gas mains ◆ Operate air compressor correctly ◆ Operate diesel power generator correctly ◆ Operate pneumatic tools correctly ◆ Distinguish different public utilities ◆ Understand underground public utilities plans <p>6.2 Methods and procedures of installing and laying gas mains (automatic butt fusion method)</p> <ul style="list-style-type: none"> ◆ Set appropriate safety distance, pipe depth and locations for installation according to the properties of soil aboveground and underground and surrounding pipework conditions ◆ Select suitable pipe support and protective measures according to the design and individual environment in application ◆ Use the automatic butt fusion method to connect PE pipes ◆ Know about the requirements for working in confined spaces ◆ Work safely in trenches underground ◆ Know about the industrial safety knowledge relevant to gas main laying works ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed 	

	<p>6.3 Professional knowledge and responsibilities for installing and laying gas mains (automatic butt fusion method)</p> <p>◆ Apply basic legislations and regulations relevant to underground public utilities installation</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install and lay PE gas mains in general road environment.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install general plastic pipes and fittings	
2. Code	EMCUIN216A	
3. Range	Perform simple installation of general plastic (e.g. PVC,ABS and UPVC) pipes and fittings, and common parts at general industrial plants, power plants or premises/work sites where boat, fire fighting, water, gas or pipe works is involved.	
4. Level	2	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Types of pipes and fitting materials</p> <ul style="list-style-type: none"> ◆ Know about the types of pipes, accessories and materials, including: <ul style="list-style-type: none"> • Types of pipes • Bends and tees • Extension joints • Joint accessories • Fill materials • Bedding and coating materials ◆ Understand hazards of solvent cement to individuals and the environment <p>6.2 Methods of installing and jointing pipes</p> <ul style="list-style-type: none"> ◆ Capable to apply general repairing and bench fitting techniques in pipe installation according to requirements ◆ Capable to joint pipes by solvent cement, etc. ◆ Capable to apply common methods of cold or thermal bending in simple installation of pipes ◆ Place rubber gaskets or pads at proper positions to prevent leakage <p>6.3 Professionalism in pipe overhaul and installation</p> <ul style="list-style-type: none"> ◆ Capable to use correct tools in simple installation of plastic pipes according to requirements ◆ Perform pipe installation according to legal requirements and the code of safety; pass the leakage test 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install common plastic pipes and fittings correctly and safely according to pipe-laying and legal requirements and the code of safety; pass the leakage test.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of mechanics and installation skills.

1. Title	Install metallic (steel/stainless steel/galvanized iron) pipes and fittings	
2. Code	EMCUIN217A	
3. Range	Perform simple installation of metallic (steel/stainless steel/galvanized iron) pipes and fittings, and common parts at general industrial plants, power plants or premises/work sites where boat, fire fighting, water, gas or pipe works is involved.	
4. Level	2	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Types of pipes and fitting materials</p> <ul style="list-style-type: none"> ◆ Know about the types of pipes, accessories and materials, including: <ul style="list-style-type: none"> • Types of pipes • Types of flanges • Bends and tees • Expansion joints • Joint accessories • Fill materials • Bedding and coating materials • Heat preservation materials <p>6.2 Methods of installing and jointing pipes</p> <ul style="list-style-type: none"> ◆ Capable to apply general repairing and bench fitting techniques, including marking, sawing, chiselling, drilling, scraping, grinding, jointing and sealing, in pipe installation according to requirements ◆ Capable to joint pipes by argon arc welding, electric arc welding, compressing, threading, flanging, etc. ◆ Capable to apply typical methods of cold or thermal bending in simple installation of pipes ◆ Place rubber gaskets or pads at proper positions for prevent leakage 	

	<p>6.3 Professionalism in pipe overhaul and installation</p> <ul style="list-style-type: none"> ◆ Capable to use correct tools in simple installation of metallic (steel/stainless steel/galvanized iron) pipes according to requirements ◆ Perform pipe installation according to legal requirements and the code of safety; pass the leakage test
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install common metallic (steel/stainless steel/galvanized iron) pipes and fittings correctly and safely according to pipe-laying and legal requirements and the code of safety; pass the leakage test.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of mechanics and installation skills.</p>

1. Title	Install non-metallic (copper/aluminium) pipes and fittings	
2. Code	EMCUIN218A	
3. Range	Perform simple installation of typical copper or aluminum pipes and fittings, at general industrial plants, power plants, ship repair, fire & plumbing, gas engineering or work sites where installation work is involved.	
4. Level	2	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Types of pipes and fitting materials</p> <ul style="list-style-type: none"> ◆ Know about the types of pipes, accessories and materials, including: <ul style="list-style-type: none"> • Types of pipes • Bends and tees • Expansion joints • Joint accessories • Fill materials • Bedding and coating materials • Heat preservation materials <p>6.2 Methods of installing and jointing pipes</p> <ul style="list-style-type: none"> ◆ Capable to apply general repairing and bench fitting techniques, including marking, sawing, chiselling, drilling, scraping, grinding, jointing and sealing, in pipe installation according to requirements ◆ Capable to joint pipes by silver soldering, copper brazing, tin soldering, compressing, etc. ◆ Capable to apply common methods of cold or thermal bending in simple installation of pipes ◆ Place rubber gaskets or pads at proper positions to prevent leakage <p>6.3 Professionalism in pipe overhaul and installation</p> <ul style="list-style-type: none"> ◆ Capable to use correct tools in simple installation of copper or aluminium pipes according to requirements ◆ Perform pipe installation according to legal requirements and the code of safety; pass the leakage test 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install common copper or aluminum pipes and fittings correctly and safely according to pipe-laying and legal requirements and the code of safety; pass the leakage test.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of mechanics and installation skills.

1. Title	Basic manual metal arc welding (MMAW)/shielded metal arc welding (SMAW)
2. Code	EMCUIN225A
3. Range	Perform basic MMAW/SMAW on typical carbon-steel metals at electrical and mechanical welding workshops or work sites.
4. Level	2
5. Credit	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Code of practice and safety regulations for MMAW/SMAW</p> <ul style="list-style-type: none"> ◆ Understand relevant code of practice and safety regulations for MMAW/SMAW, including: <ul style="list-style-type: none"> • Wearing proper personal protective gear • Protecting against electric shock • Protecting against fire and explosion • Protecting against harmful arc ray effectively • Protecting against harmful gases and poisonous fumes ◆ Know about the preparations for MMAW/SMAW, including: <ul style="list-style-type: none"> • Understanding the general application and their limitations of MMAW/SMAW • Understanding the types of MMAW/SMAW machines and their functions • Knowing about the specifications, applications, uses and storage of common mild-steel electrodes (such as E6013) for MMAW/SMAW • Knowing about the maintenance of MMAW/SMAW equipment

	<p>6.2 Methods and procedures for operating MMAW/SMAW</p> <ul style="list-style-type: none"> ◆ Apply MMAW/SMAW technique in welding <ul style="list-style-type: none"> • Select proper parameters for welding, such as polarity, current, welding speed and angle of electrode • Perform tasks including: <ul style="list-style-type: none"> ▸ Performing linear surface buildup at flat position ▸ Joining two or more work pieces together at flat position ▸ Performing two sides square edge butt welding at flat position ▸ Performing fillet weld at flat position ◆ Maintenance of electric arc welding equipment <ul style="list-style-type: none"> • Undertake maintenance of MMAW/SMAW equipment • Use and store common instruments and welding materials <p>6.3 Professionalism in MMAW/SMAW</p> <ul style="list-style-type: none"> ◆ Perform MMAW/SMAW tasks according to relevant safety guidelines and code of practice
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to complete basic MMAW/SMAW tasks without causing obvious surface weld defects; and</p> <p>(ii) Capable to perform MMAW/SMAW tasks safely.</p>
8. Remarks	<p>This unit of competency is applicable to general electrical and mechanical welding practitioners.</p>

1. Title	Maintain and repair supply system and leakage detection system in LPG filling station
2. Code	EMGAOR201A
3. Range	Maintain and repair supply systems and leakage detection systems in LPG filling stations, including dispenser, LPG pump, dispensing system control panel, pneumatic system control panel and emergency shut-down system.
4. Level	2
5. Credits	14
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of maintaining and repairing supply system and leakage detection system in LPG filling station</p> <ul style="list-style-type: none"> ◆ Use multi-meter correctly to measure the resistance, current and voltage of circuit ◆ Use clamp ammeter correctly to measure current of power line ◆ Use insulation meter to measure insulation resistance of power line ◆ Use phase meter correctly to measure phase sequence of the three-phase power source ◆ Master the application of common pneumatic tools ◆ Understand the pneumatic control principles ◆ Understand the emergency shut-down system ◆ Understand the system and operation flow of filling station ◆ Understand the gas detection system ◆ Understand the internal structure of dispenser <p>6.2 Methods and procedures of maintaining and repairing supply system and leakage detection system in LPG filling station</p> <ul style="list-style-type: none"> ◆ Handle the faults of the LPG tanks and valves or leakage correctly ◆ Handle the faults of the dispenser correctly ◆ Handle the faults of the pneumatic valves correctly ◆ Handle the faults of the emergency shut-down system correctly ◆ Handle the faults of the control panel correctly

	<ul style="list-style-type: none"> ◆ Handle the faults of the LPG pumps correctly ◆ Handle the faults of the gas detector correctly ◆ Purge the remaining LPG in the station equipment ◆ Set the maintenance sequence according to the station equipment maintenance plan, and report to the management <p>6.3 Professional knowledge and responsibilities for maintaining and repairing supply system and leakage detection system in LPG filling station</p> <ul style="list-style-type: none"> ◆ Follow the manufacturer's and technical instructions to install equipment to meet the explosion-proof specifications ◆ Understand basic classification of hazard zone
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to carry out maintenance for the LPG systems and equipment in the LPG filling station; and</p> <p>(ii) Capable to repair the LPG systems and equipment in the LPG filling station.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Maintain and repair gas service pipes
2. Code	EMGAOR202A
3. Range	Perform maintenance and repair work such as repairing leakage, replacing leaked pipe section, corrosion treatment, etc. (not including pipe welding) for gas service pipes (including service risers, service pipes within pipe ducts and downers) at external walls of buildings.
4. Level	2
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of maintaining and repairing gas service pipes</p> <ul style="list-style-type: none"> ◆ Choose suitable equipment to avoid accident happening when working at height ◆ Point out the potential hazards of maintaining and repairing live gas service pipes <p>6.2 Methods and procedures of maintaining and repairing gas service pipes</p> <ul style="list-style-type: none"> ◆ Consider the safety risk, degree of difficulty of the process and influence on customers to decide whether to handle the live gas pipe or not ◆ Judge the degree of damage of service pipe to decide on a suitable remedial actions ◆ Maintain the corroded part of the service pipe properly ◆ Wrap Denso tape around the pipe section with minor leakage ◆ Use tools and equipment safely to maintain and repair service pipes at high-rise external walls ◆ Perform screw thread connection for service pipes

	<p>6.3 Professional knowledge and responsibilities for maintaining and repairing gas service pipes</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply all the provisions in the Gas Utilisation Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply other gas related regulations and codes of practice relevant to gas installation
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to replace the leaked service pipe section at external walls of buildings; and</p> <p>(ii) Capable to repair the leaked service pipes at external walls of buildings.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAIT211A 【Install domestic and commercial and industrial gas service pipes and relevant equipment】 .</p>

1. Title	Maintain and repair domestic gas appliances
2. Code	EMGAOR203A
3. Range	Perform maintenance and repair work for domestic gas appliances (including mechanical and electronic controlled ones) in general domestic premises.
4. Level	2
5. Credits	10
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of domestic gas appliance maintenance and repair</p> <ul style="list-style-type: none"> ◆ Use a multi-meter correctly to measure the circuit of domestic gas appliance <p>6.2 Methods and procedures of domestic gas appliance maintenance and repair</p> <ul style="list-style-type: none"> ◆ Operate instruments to check whether the exhaust meets the requirements ◆ Repair the mechanical faults of domestic gas appliances ◆ Repair the electronic faults of domestic gas appliances ◆ Explain the structure of various types of domestic gas appliances ◆ Commission the domestic gas appliance correctly ◆ Decommission the domestic gas appliance correctly ◆ Operate the gas detector correctly ◆ Locate and repair the leakage ◆ Explain to customers the noting points for using the appliances

	<p>6.3 Professional knowledge and responsibilities for domestic gas appliance maintenance and repair</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to repair a domestic mechanical gas water heater with several faults; and (ii) Capable to repair a domestic electronic gas water heater with several faults.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Operate LPG road tanker equipment	
2. Code	EMGAOR204A	
3. Range	Operate LPG road tanker instruments safely, fill LPG road tankers with LPG at LPG compounds and off-load LPG at central LPG supply systems or filling stations.	
4. Level	2	
5. Credits	4	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of operating LPG road tanker instruments</p> <ul style="list-style-type: none"> ◆ Understand how to avoid frostbite caused by LPG ◆ Use dry powder fire extinguisher correctly ◆ Master the handling of gas leakage ◆ Master general fire safety knowledge <p>6.2 Methods and procedures of operating LPG road tanker instruments</p> <ul style="list-style-type: none"> ◆ Open and close the LPG road tanker valves correctly ◆ Connect and disconnect the earthing cable correctly ◆ Connect and disconnect the off-loading hose correctly ◆ Start and stop the off-loading pump correctly ◆ Operate the fixed contents gauge correctly ◆ Read the flowmeter readings correctly ◆ Handle emergencies correctly, e.g. auto parts failure and traffic accident <p>6.3 Professional knowledge and responsibilities for operating LPG road tanker instruments</p> <ul style="list-style-type: none"> ◆ Know about the potential hazards during the LPG road tanker machine operation, and select suitable personal protective equipment ◆ Master industrial safety knowledge relevant to road tanker ◆ Know the causes of static electricity to LPG road tankers and how to prevent electrostatic accidents 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to fill LPG road tankers with LPG at LPG compounds and off-load LPG at central LPG supply systems or filling stations.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Operate LPG cylinder wagon and complete the LPG delivery process
2. Code	EMGAOR205A
3. Range	Operate LPG cylinder wagons and deliver LPG cylinders to customers safely and properly.
4. Level	2
5. Credits	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of LPG cylinder wagon operation and LPG delivery process</p> <ul style="list-style-type: none"> ◆ Understand how to avoid frostbite caused by LPG ◆ Master the handling of gas leakage ◆ Master fire safety knowledge ◆ Use dry powder fire extinguisher correctly ◆ Master industrial safety knowledge relevant to LPG delivery process ◆ Master the correct way of manual lifting <p>6.2 Methods and procedures of LPG cylinder wagon operation and LPG delivery process</p> <ul style="list-style-type: none"> ◆ Operate the LPG cylinder wagon's tail-gate lift correctly for off-loading ◆ Carry the LPG cylinders correctly to customers ◆ Put LPG cylinders correctly on the LPG wagon ◆ Handle leakage according to instructions <p>6.3 Professional knowledge and responsibilities for LPG cylinder wagon operation and LPG delivery process</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to operate the LPG cylinder wagon's tail-gate lift correctly for off-loading LPG cylinders, and use the correct manual lifting way to carry the LPG cylinders to the customers.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Operate LPG filling station	
2. Code	EMGAOM201A	
3. Range	Work in the LPG filling station and report to the superior correctly on the situation about the safety and operation of the filling station; arrange LPG vehicles for refuel and control the order and traffic in the filling station.	
4. Level	2	
5. Credits	6	
6. Competency	<p>6.1 Knowledge and principles of operating LPG filling station</p>	<p><u>Performance Requirements</u></p> <ul style="list-style-type: none"> ◆ Know about the peak hours for LPG vehicle refuel ◆ Understand the refuelling procedures for LPG vehicles ◆ Understand the meanings of different traffic signs ◆ Understand the consumption pattern of filling station ◆ Understand the income accounting method ◆ Understand the account management method ◆ Know about the stock control ◆ Understand the influence of delivery lead-time on the operation of the filling station ◆ Have good relationship with LPG vehicle drivers ◆ Understand taxi and minibus jargons ◆ Understand the operation of taxi and minibus industries ◆ Understand the meanings of gas detection system's readings ◆ Distinguish normal and faulty situations for all kinds of systems

	<p>6.2 Methods and procedures of operating LPG filling station</p> <ul style="list-style-type: none"> ◆ Read the percentage of gas level remained in the LPG cylinder shown on the contents gauge and estimate correctly the usable time ◆ Handle and report on emergencies (e.g. drivers fighting, making trouble, traffic accidents in the filling station, etc.) ◆ Identify the conditions of facilities in the station and arrange technical personnel for repairs ◆ Indicate LPG vehicles to suitable positions for refuel ◆ Estimate daily LPG consumption and arrange the road tanker to refill during non-peak hours ◆ Indicate LPG vehicles to suitable positions for refuel ◆ Handle general disputes in the filling station ◆ Put appropriate road signs at suitable positions ◆ Master the handling of gas leakage ◆ Master the control of gas detection system ◆ Master and operate the management and recording system software <p>6.3 Professional knowledge and responsibilities for operating LPG filling station</p> <ul style="list-style-type: none"> ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to work in the LPG filling station and report to the superior correctly on the situation about the safety and operation of the filling station; arrange LPG vehicles for refuel and control the order and traffic in the filling station.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Operate LPG cylinder wagon	
2. Code	EMGAOM202A	
3. Range	Drive LPG cylinder wagon safely on the road, operate the devices on the wagon to load and off-load LPG cylinders, and handle general LPG cylinder wagon accidents.	
4. Level	2	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of LPG cylinder wagon operation</p> <ul style="list-style-type: none"> ◆ Understand how to avoid frostbite caused by LPG ◆ Point out the definition of Class II dangerous goods ◆ List places or road sections closed to Class II dangerous goods vehicles ◆ Understand the code of safety for working in LPG compound ◆ Understand the basic structure of LPG cylinder wagon, e.g. body height and length of LPG cylinder wagon ◆ Understand the requirements for safe operation of LPG cylinder wagon ◆ Understand the pickup and storage procedures for LPG cylinders in LPG compound ◆ Master general fire safety knowledge <p>6.2 Methods and procedures of LPG cylinder wagon operation</p> <ul style="list-style-type: none"> ◆ Operate LPG cylinder wagon facilities correctly, e.g. tail-gate lift, emergency shut-down button, etc. ◆ Use handheld dry powder fire extinguisher correctly ◆ Drive LPG cylinder wagon safely ◆ Master the handling of gas leakage ◆ Stack up LPG cylinders correctly onto the LPG cylinder wagon 	

	<p>6.3 Professional knowledge and responsibilities for LPG cylinder wagon operation</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to drive LPG cylinder wagon safely on the road, operate the devices on the wagon to load and off-load LPG cylinders, and handle general LPG cylinder wagon accidents.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and a medium vehicle driving licence.</p>

1. Title	Operate LPG road tanker	
2. Code	EMGAOM203A	
3. Range	Capable to drive LPG road tanker safely on the road, operate the devices on the tanker to load and off-load LPG, and handle general LPG road tanker accidents.	
4. Level	2	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of LPG road tanker operation</p> <ul style="list-style-type: none"> ◆ Understand how to avoid frostbite caused by LPG ◆ Point out the definition of Class II dangerous goods ◆ List places or road sections closed to Class II dangerous goods vehicles ◆ Understand the code of safety for working in LPG compound ◆ Understand the basic structure of LPG road tanker, e.g. body height and length of LPG road tanker ◆ Understand the requirements for safe operation of LPG road tanker, e.g. speed limit, procedures of operation, etc. ◆ Understand the pickup and storage procedures in LPG compound ◆ Master general fire safety knowledge <p>6.2 Methods and procedures of LPG road tanker operation</p> <ul style="list-style-type: none"> ◆ Operate LPG road tanker facilities correctly, e.g. emergency shut-down button, booster pump, flowmeter, connecting hose for off-loading, earthing cable, all kinds of valves, etc. ◆ Use handheld dry powder fire extinguisher correctly ◆ Drive LPG road tanker safely ◆ Master the handling of gas leakage 	

	<ul style="list-style-type: none"> ◆ Off-load LPG correctly from LPG compound to LPG road tanker ◆ Off-load LPG correctly from LPG road tanker to underground LPG tanks <p>6.3 Professional knowledge and responsibilities for LPG road tanker operation</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to drive LPG road tanker safely on the road, operate the devices on the tanker to load and off-load LPG, and handle general LPG road tanker accidents.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and a medium vehicle driving licence.</p>

1. Title	Apply effective communication skills in discussions of electrical and mechanical issues	
2. Code	EMCUOM204A	
3. Range	With regard to electrical and mechanical operation management, apply effective communication skills to actively discuss, exchange ideas and respond to electrical and mechanical related issues (e.g. design, installation, inspection, commissioning, testing, running, repair, maintenance, occupational safety and health, project management, quality management, sales and marketing, etc.).	
4. Level	2	
5. Credit	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Effective communication skills</p> <ul style="list-style-type: none"> ◆ Understand effective communication skills, including speaking skill, listening skill, summarizing skill and interpersonal skill ◆ Understand the functions of different communication media / tools <ul style="list-style-type: none"> • Using email or fax • Using telephone for liaison and communication • Holding meetings, etc. ◆ Understand common terminology and technical terms used in the electrical and mechanical engineering services industry <p>6.2 Understand work scope of the electrical and mechanical services, and apply effective communication skills to exchange ideas and foster discussion</p> <ul style="list-style-type: none"> ◆ Understand the work scope of the electrical and mechanical services, such as design, installation, inspection, commissioning, testing, running, repair, maintenance, occupational safety and health, project management, quality management, sales and marketing, etc.; and be capable to apply effective communication skills to exchange ideas and foster discussion so as to achieve the purpose of idea exchange and information delivery 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to apply effective communication skills and common terminology and technical terms used in the industry to take part in the discussion of electrical and mechanical issues.
8. Remarks	This unit of competency is applicable to electrical and mechanical practitioners in general.

1. Title	Sell gas appliances to domestic customers	
2. Code	EMGAMS201A	
3. Range	Sell gas appliances to domestic customers.	
4. Level	2	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of selling gas appliances to domestic customers</p> <ul style="list-style-type: none"> ◆ Understand different types of domestic gas appliances, their applications and structure ◆ Master sales techniques, understand customers' needs and recommend suitable gas appliances to them <p>6.2 Methods and procedures of selling gas appliances to domestic customers</p> <ul style="list-style-type: none"> ◆ List the noting points for using different types of domestic gas appliances ◆ Point out restrictions on the installation and use of different domestic gas appliances ◆ Point out different types of domestic gas appliances ◆ Point out the characteristics of different domestic gas appliances ◆ Point out the specifications and installation requirements for different domestic gas appliances ◆ Point out the advantages and disadvantages of different gases and other sources of energy ◆ Point out the correct use of different domestic gas appliances ◆ Point out the advantages and disadvantages of different domestic gas appliances ◆ Point out how to handle gas leakage 	

	<p>6.3 Professional knowledge and responsibilities for selling gas appliances to domestic customers</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51, and answer customer enquiries on the installation of domestic gas appliances ◆ Apply all the provisions in the Code of Practice GU03 on [Installation Requirements for Domestic Gas Water Heaters], and answer customer enquiries on the installation of domestic gas appliances ◆ Apply other gas related regulations and codes of practice, and answer customer enquiries on the installation of domestic gas appliances
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to point out the advantages and disadvantages of different domestic gas appliances, and recommend suitable ones to customers; and (ii) Capable to answer customer enquiries correctly on the use and installation of domestic gas appliances.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Confirm that LPG cylinders are suitable for further use
2. Code	EMGAGS201A
3. Range	Check the external conditions of LPG cylinders in LPG compounds and determine whether the cylinders should be disposed of or need further treatment. Checking items include date of pressure test, surface coat, and condition of corrosion and rugged surface of the cylinders.
4. Level	2
5. Credits	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of confirming that LPG cylinders are suitable for further use</p> <ul style="list-style-type: none"> ◆ Understand the effects of the change in physical properties of metal upon corrosion on cylinder safety ◆ Understand the causes of metallic corrosion and its prevention <p>6.2 Methods and procedures of confirming that LPG cylinders are suitable for further use</p> <ul style="list-style-type: none"> ◆ Follow prescribed safety guidelines to check whether the surface corrosion of LPG cylinder meets the safety standards ◆ Follow prescribed safety guidelines to check whether the surface coat of LPG cylinder meets the safety standards ◆ Follow prescribed safety guidelines to check whether the surface erosion and damages of LPG cylinder meet the safety standards ◆ Follow prescribed safety guidelines to analyze data on the cylinder and decide whether testing is required ◆ Follow prescribed safety guidelines to invalidate the LPG cylinder ◆ Follow prescribed safety guidelines to arrange pressure retesting of the LPG cylinder ◆ Follow prescribed safety guidelines to arrange renovation of the LPG cylinder

	<p>6.3 Professional knowledge and responsibilities for confirming that LPG cylinders are suitable for further use</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to point out the date and safety standards for retesting pressure of the LPG cylinder, and decide whether the LPG cylinder is suitable for gas filling or repair.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

Competency Level 3

1. Title	Design domestic gas supply system (service pipes and relevant equipment)
2. Code	EMGADE301A
3. Range	Design gas supply system (service pipes and relevant equipment) installation work for customers in a cost-effective way for domestic premises to be built according to customers' needs as well as the requirements of the gas safety regulation and codes of practice; take the initiative to accomplish the design task independently and brief the engineering personnel or people concerned on the engineering details; and provide special solutions for non-routine engineering environment.
4. Level	3
5. Credits	5
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing domestic gas supply system (service pipes and relevant equipment)</p> <ul style="list-style-type: none"> ◆ Understand construction plan and point out spots and locations not suitable for gas supply system installation, and suggest solutions accordingly ◆ Organize and evaluate the building design, and design a suitable route for service pipes ◆ Understand and conform with the works specifications of domestic gas supply system (service pipes and relevant equipment) <p>6.2 Methods and procedures of designing domestic gas supply system (service pipes and relevant equipment)</p> <ul style="list-style-type: none"> ◆ Calculate the total gas consumption correctly and consider various factors ◆ Calculate correctly to select pipes with suitable diameters ◆ Design gas piping route ◆ Select 2nd stage regulator at roof with suitable gas flow rate, inlet and outlet pressure and over pressure cut-off function ◆ Select and use suitable equipment e.g. expansion joints, insulated socket, etc. ◆ Draw the pipework drawing

	<p>6.3 Professional knowledge of designing domestic gas supply system (service pipes and relevant equipment)</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to organize and evaluate the building design and design domestic gas supply system (service pipes and relevant equipment) installation work.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Use computer to draw combined services drawings of building services	
2. Code	EMCUDE317A	
3. Range	Use computer to draw combined services drawings of building services as electrical and mechanical engineering design is involved.	
4. Level	3	
5. Credit	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Computer engineering drawing techniques and methods</p> <ul style="list-style-type: none"> ◆ Understand the techniques and methods of using computer to draw combined services drawings of building services, including: <ul style="list-style-type: none"> • Setting layer rules for combined services drawings of building services • Difference between drawing the equipment on layout plan directly and drawing on external reference drawings • Management and application of external reference drawings • Setting of configuration and drawing specifications <p>6.2 Application of computer in engineering drawing</p> <ul style="list-style-type: none"> ◆ Use the computer to draw combined services drawings of building services, including: <ul style="list-style-type: none"> • Copy the electrical and mechanical drawing layer needed from an electrical and mechanical layout plan to another electrical and mechanical layout plan to form a combined services drawings of building services • Compile the drawing layer of electrical and mechanical facilities with reference to external sources • Use information saved in files or databank to improve the efficiency of drawing ◆ Retrieve, manage and apply external reference drawings efficiently 	

7. Assessment Criteria	The integrated outcome requirements of this unit of competency are: (i) Capable to draw a combined services drawings of building services according to design by including and merging building services drawings of different floors of the building and form a comprehensive building services drawing ; and (ii) Capable to use information saved in files or databank, including the external reference drawings, to improve the efficiency of drawing.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of drawing basic electrical and mechanical drawings with computer.

1. Title	Choose typical materials for electrical and mechanical work
2. Code	EMCUDE318A
3. Range	Choose appropriate materials commonly used in electrical and mechanical work to perform the work of design, installation and repair.
4. Level	3
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Functions, properties and range of application of common electrical and mechanical materials</p> <ul style="list-style-type: none"> ◆ Understand the functions, properties and range of application of common metallic and non-metallic materials, including: <ul style="list-style-type: none"> • Physical properties and chemical properties such as electric induction, thermal induction, expansion and contraction, anti-corrosion, solubility, etc. • Mechanical properties such as strength, hardness, resilience, fatigue limit, high-temperature strength, etc. • Processing properties such as casting, extension, welding, machining, heat treatment, etc. • Understand the functions and range of application of common metallic and non-metallic materials, such as their functions, application conditions and limitations for applying to the branches of electricity, air-conditioning, ship repair machinery and plant engineering, etc.

	<p>6.2 Choose electrical and mechanical materials needed</p> <ul style="list-style-type: none"> ◆ Capable to choose appropriate materials commonly used in electrical and mechanical work according to their properties and range of application as well as the engineering requirements and specifications in order to perform the work of electrical and mechanical design, installation and repair ◆ Capable to choose and check the materials to ensure that they comply with the safety specifications
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to choose appropriate materials commonly used in electrical and mechanical work according to their functions, properties and range of applications as well as the safety specifications in order to perform the work of electrical and mechanical design, installation and repair.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of electrical and mechanical materials.</p>

1. Title	Install, test and commission fixed gas detection system and other relevant instruments
2. Code	EMGAI301A
3. Range	Install, test and commission fixed gas detection system and other relevant instruments in places where gas monitoring is needed (e.g. central LPG supply system, LPG filling station, repair workshop, etc.).
4. Level	3
5. Credits	7
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing, testing and commissioning fixed gas detection system and other relevant instruments</p> <ul style="list-style-type: none"> ◆ Point out respectively the effects of Towngas, LPG and natural gas on the safety of explosion-proof and hazard zone ◆ Point out respectively the danger category and level and temperature group of Towngas, LPG and natural gas ◆ Understand the classification of hazard zone <p>6.2 Methods and procedures of installing, testing and commissioning fixed gas detection system and other relevant instruments</p> <ul style="list-style-type: none"> ◆ Select suitable explosion-proof gas detection systems for different dangerous environments ◆ Use a multi-meter correctly to measure the resistance, current and voltage of circuit ◆ Install gas detection system correctly ◆ Select correct position for gas detection system installation ◆ Calibrate the gas detection system correctly <p>6.3 Professional knowledge and responsibilities for installing, testing and commissioning fixed gas detection system and other relevant instruments</p> <ul style="list-style-type: none"> ◆ Understand the effects of explosion-proof principles on engineering safety

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to install, test and commission fixed gas detection system and other relevant instruments in places where gas monitoring is needed (e.g. central LPG supply system, LPG filling station, repair workshop, etc.).
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Install and commission commercial and industrial gas appliances	
2. Code	EMGAIT302A	
3. Range	Use suitable materials and processes to install and commission commercial and industrial gas appliances in commercial and industrial premises.	
4. Level	3	
5. Credits	7	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and commissioning commercial and industrial gas appliances</p> <ul style="list-style-type: none"> ◆ List positions and environments not suitable for flued gas appliance and flue duct installation ◆ List the definition of unsafe gas appliance ◆ List out points to note for using gas appliances <p>6.2 Methods and procedures of installing and commissioning commercial and industrial gas appliances</p> <ul style="list-style-type: none"> ◆ Inspect construction work relevant to gas appliance flue installation, and exhaust facilities and safety distance required ◆ Carry out commissioning for commercial and industrial gas appliances ◆ Conduct combustion and exhaust testing correctly for commercial and industrial gas appliances ◆ Test the functions of safety equipment correctly ◆ Install the electrical part of commercial and industrial gas appliances ◆ Locate the installation position of gas appliances according to the working drawing ◆ Install commercial and industrial gas appliances ◆ Brief users on points to note for using and maintaining the appliances 	

	<p>6.3 Professional knowledge and responsibilities for installing and commissioning commercial and industrial gas appliances</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice GU03 on [Installation Requirements for Domestic Gas Water Heaters] ◆ Apply all the provisions in the Gas Utilisation Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU12 on [Installation of Mechanical Exhaust System for Gas Appliances] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to use suitable materials and procedures to install and commission commercial and industrial gas appliances in commercial and industrial premises.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 , EMGAIT205A 【Install domestic flue gas appliances】 and EMGAIT206A 【Install domestic flueless gas appliances】 .</p>

1. Title	Install and commission LPG supply system of LPG vehicle	
2. Code	EMGAI303A	
3. Range	Install or detach LPG cylinder from LPG vehicle at LPG vehicle workshop, and commission and decommission LPG supply system of LPG vehicle.	
4. Level	3	
5. Credits	8	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and commissioning LPG supply system of LPG vehicle</p> <ul style="list-style-type: none"> ◆ Understand the whole gas supply system of LPG vehicle ◆ Understand vehicle workshop requirements e.g. gas detection requirements, ventilation requirements, fire service requirements, etc. ◆ Understand the construction and functions of various gas supply system parts ◆ Master general fire safety knowledge ◆ Use dry powder fire extinguisher correctly ◆ Understand how to avoid frostbite caused by LPG ◆ Select suitable materials for thread sealing <p>6.2 Methods and procedures of installing and commissioning LPG supply system of LPG vehicle</p> <ul style="list-style-type: none"> ◆ Decommission gas supply system of LPG vehicle correctly ◆ Install and detach LPG cylinder correctly ◆ Handle the detached LPG cylinder correctly ◆ Connect LPG pipe correctly ◆ Operate handheld gas detector to ensure that the LPG system is soundness ◆ Regulate the exhaust correctly ◆ Regulate exchanger outlet pressure correctly ◆ Commission gas supply system of LPG vehicle correctly 	

	<p>6.3 Professional knowledge and responsibilities for installing and commissioning LPG supply system of LPG vehicle</p> <ul style="list-style-type: none"> ◆ Apply 【Guideline for Revalidation of LPG Fuel Tanks for LPG Vehicles】 issued by the Electrical and Mechanical Services Department ◆ Apply other gas related regulations and codes of practice ◆ Understand the definition criteria for hazard zone ◆ Understand the basic principles of explosion-proof
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install or detach LPG cylinder from LPG vehicle at LPG vehicle workshop, and commission and decommission LPG supply system of LPG vehicle.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Carry out live gas main installation	
2. Code	EMGAIT304A	
3. Range	Carry out live gas main installation on road surface in general road environment.	
4. Level	3	
5. Credits	8	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of live gas main installation</p> <ul style="list-style-type: none"> ◆ Understand the characteristics and range of application of various types of pipes ◆ Distinguish different public utilities ◆ Understand underground public utilities plans ◆ Know about the requirements for working in confined spaces ◆ Work safely in trenches underground ◆ Know about the industrial safety knowledge relevant to gas main laying <p>6.2 Methods and procedures of live gas main installation</p> <ul style="list-style-type: none"> ◆ Carry out soundness test correctly for the gas main ◆ Carry out live gas main installation correctly ◆ Operate the WASK bagging system correctly ◆ Arrange for emergency measures, e.g. temporary gas supply ◆ Connect the temporary gas supply system correctly ◆ Carry out purging correctly for the gas main ◆ Carry out commissioning correctly for the gas main ◆ Explain the working drawing of the gas network clearly and put on record the work completed 	

	<p>6.3 Professional knowledge and responsibilities for live gas main installation</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to carry out live gas main installation on road surface in general road environment.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install, test and commission LPG storage tank	
2. Code	EMGAIT305A	
3. Range	Install, test and commission LPG storage tank in central LPG supply system.	
4. Level	3	
5. Credits	9	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of LPG storage tank installation, testing and commissioning</p> <ul style="list-style-type: none"> ◆ Understand the functions and operation of LPG supply system equipment ◆ Understand installation and testing requirements on cathode protection device ◆ Understand the work flow of LPG supply system ◆ Understand how to avoid frostbite caused by LPG <p>6.2 Methods and procedures of LPG storage tank installation, testing and commissioning</p> <ul style="list-style-type: none"> ◆ Cover LPG storage tank correctly with earth again after pressure test ◆ Conduct hydraulic test correctly for LPG storage tank ◆ Conduct pressure test correctly for LPG storage tank ◆ Move LPG storage tank away from and back to chamber ◆ Commission LPG storage tank correctly ◆ Decommission LPG storage tank correctly ◆ Install tank surface valve and equipment correctly and ensure no leakage ◆ Reconnect pipe to tank surface valve correctly and ensure soundness 	

	<p>6.3 Professional knowledge and responsibilities for LPG storage tank installation, testing and commissioning</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 7 [Operating Procedures for Emergencies for LPG Compounds and Cylinder Stores] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install, test and commission LPG storage tank in central LPG supply system.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Install and commission gas pressure control equipment in supply network
2. Code	EMGAIT306A
3. Range	Install and commission gas pressure control equipment in general supply network
4. Level	3
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of installing and commissioning gas pressure control equipment in supply network</p> <ul style="list-style-type: none"> ◆ Understand the pressure of all parts in the supply system <p>6.2 Methods and procedures of installing and commissioning gas pressure control equipment in supply network</p> <ul style="list-style-type: none"> ◆ Calibrate gas pressure control equipment correctly ◆ Install gas pressure control equipment correctly ◆ Commission gas pressure control equipment correctly
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install and commission gas pressure control equipment in general supply network.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Perform pressure tests, purging and commissioning for gas mains
2. Code	EMGAIT307A
3. Range	Perform pressure tests, purging and commissioning for gas mains in general road environment.
4. Level	3
5. Credits	8
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of pressure tests, purging and commissioning of gas mains</p> <ul style="list-style-type: none"> ◆ Point out testing pressure correctly <p>6.2 Methods and procedures of pressure tests, purging and commissioning of gas mains</p> <ul style="list-style-type: none"> ◆ Arrange for emergency measures, e.g. temporary gas supply ◆ Carry out air pressure test correctly for the gas main ◆ Carry out hydraulic test correctly for the gas main ◆ Connect the temporary gas supply system correctly ◆ Liaise with and inform in advance parties being affected ◆ Carry out purging correctly for the gas main ◆ Carry out commissioning correctly for the gas main
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform pressure tests, purging and commissioning for gas mains in general road environment.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAIT202A 【Perform pressure tests, purging and commissioning for installation pipes, service pipes and relevant equipment】 .

1. Title	Inspect, commission and decommission LPG supply system	
2. Code	EMGAIT308A	
3. Range	Inspect, commission and decommission LPG supply system in LPG central supply system.	
4. Level	3	
5. Credits	9	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of LPG supply system inspection, commissioning and decommissioning</p> <ul style="list-style-type: none"> ◆ Understand the functions and operating method of LPG supply system equipment ◆ Understand the work flow of LPG supply system ◆ Understand how to avoid frostbite caused by LPG <p>6.2 Methods and procedures of LPG supply system inspection, commissioning and decommissioning</p> <ul style="list-style-type: none"> ◆ Inspect and calibrate LPG supply system equipment correctly, such as pressure meter, automatic liquid exchanger, pressure regulator, vaporizer, etc. ◆ Conduct hydraulic test for LPG pipes according to the gas safety regulation and Code of practice ◆ Conduct pressure test for LPG pipes according to the gas safety regulation and Code of practice ◆ Commission the gas supply system correctly ◆ Decommission the gas supply system correctly ◆ Dispose of the remaining LPG in liquid form correctly ◆ Dispose of the heavy oil correctly 	

	<p>6.3 Professional knowledge and responsibilities for LPG supply system inspection, commissioning and decommissioning</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 2 [Underground LPG Pipework] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to inspect, commission and decommission LPG supply system in LPG central supply system.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Perform manual metal arc welding (MMAW) / shielded metal arc welding (SMAW) on different kinds of steel according to drawings	
2. Code	EMCUIN321A	
3. Range	Perform general MMAW/SMAW tasks for common carbon steel, high carbon steel or stainless steel, according to drawings, at electrical and mechanical welding workshops or work sites.	
4. Level	3	
5. Credit	4	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Preparations for MMAW/SMAW</p> <ul style="list-style-type: none"> ◆ Read the drawings correctly (including symbolisation of welding symbols and welding processes) ◆ Understand the code of safety for MMAW/SMAW ◆ Understand the application of different electrodes ◆ Understand technical requirements of different kinds of steel on different electrodes ◆ Understand the classification of weld examination ◆ Understand the mechanical properties of metals ◆ Understand weld defects such as undercut, overlap, porosities, cracks and slag inclusions <p>6.2 Perform MMAW/SMAW according to drawings</p> <ul style="list-style-type: none"> ◆ Estimate the impact of welding procedure on the dimensions of work piece ◆ Perform assembly (including root opening, tack weld and anti-distortion procedure) according to the drawing 	

	<ul style="list-style-type: none"> ◆ Inspect the dimensions of weld and surface weld defects ◆ Select electrodes according to the properties of steels ◆ Use different electrodes for welding ◆ Perform welding tasks according to the properties of different kinds of steel <p>6.3 Professionalism in MMAW/ SMAW</p> <ul style="list-style-type: none"> ◆ Perform MMAW/ SMAW tasks according to relevant safety guidelines and code of practice
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to follow the safety instructions and code of practice to apply MMAW/ SMAW in one-side full-penetration welding at flat position, at horizontal position, at vertical up position and at overhead position, according to drawings, on different kinds of steel;</p> <p>(ii) Capable to apply MMAW/ SMAW in fillet welding at flat position, at horizontal position, at vertical up position, at vertical down position and at overhead position, according to drawings, on different kinds of steel; and</p> <p>(iii) Capable to point out the classification, specification and application of different electrodes and to select proper electrodes according to the properties of different kinds of steel.</p>
8. Remarks	<p>This unit of competency is suitable for enhancing the competency of electrical and mechanical welding practitioners. The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMCUIN225A “Basic manual metal arc welding (MMAW) / shielded metal arc welding (SMAW)”.</p>

1. Title	Handle general gas leakage in premises
2. Code	EMGAOR301A
3. Range	Handle general gas leakage accidents in premises.
4. Level	3
5. Credits	4
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling general gas leakage in premises</p> <ul style="list-style-type: none"> ◆ Understand the design of gas supply system, including the path, and the locations of riser main switch and valve of manifold ◆ Understand the pipework drawing <p>6.2 Methods and procedures of handling general gas leakage in premises</p> <ul style="list-style-type: none"> ◆ Judge the seriousness of leakage and take appropriate steps at once ◆ Use handheld gas detector to locate the leakage ◆ Operate handheld gas detector correctly ◆ Take suitable temporary steps for pipe sections with minor leakage ◆ Close the gas supply valve correctly to stop gas supply ◆ Cooperate with the firemen and police on spot ◆ Ensure the safety of lives and properties when the leakage is out of control <p>6.3 Professional knowledge and responsibilities for handling general gas leakage in premises</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to handle general gas leakage accidents in premises.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Inspect and repair gas supply system of LPG vehicle	
2. Code	EMGAOR302A	
3. Range	Inspect and repair gas supply system equipment of LPG vehicle at vehicle workshop, including the LPG cylinder, pipes, vaporizer, pressure regulator, mixer and other accessories.	
4. Level	3	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of inspecting and repairing gas supply system of LPG vehicle</p> <ul style="list-style-type: none"> ◆ Understand the whole gas supply system of LPG vehicle ◆ Know about the names of various gas supply system parts ◆ Understand the construction and functions of various gas supply system parts ◆ Master general fire safety knowledge ◆ Use dry powder fire extinguisher correctly <p>6.2 Methods and procedures of inspecting and repairing gas supply system of LPG vehicle</p> <ul style="list-style-type: none"> ◆ Discharge the remaining LPG in liquid form safely ◆ Identify and repair LPG vehicle gas faults ◆ Decommission the gas supply system ◆ Commission the gas supply system ◆ Disconnect and reconnect the LPG in liquid form pipe ◆ Use handheld gas detector ◆ Use the handheld gas detector to identify leakage position ◆ Repair the leakage position 	

	<p>6.3 Professional knowledge and responsibilities for inspecting and repairing gas supply system of LPG vehicle</p> <ul style="list-style-type: none"> ◆ Apply 【Guideline for Revalidation of LPG Fuel Tanks for LPG Vehicles】 issued by the Electrical and Mechanical Services Department ◆ Apply other gas related regulations and codes of practice ◆ Understand the definition criteria for hazard zone ◆ Understand the basic principles of explosion-proof ◆ Understand vehicle workshop requirements and install equipment according to explosion-proof specifications
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Discharge the remaining LPG in liquid form in the vehicle pipe correctly and safely; (ii) Disconnect and reconnect the LPG vehicle exchanger correctly and safely; and (iii) Use the handheld gas detector to identify the leakage position and repair it.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Maintain and repair underground gas mains
2. Code	EMGAOR303A
3. Range	Carry out routine maintenance, repair and emergency repair on general road service for all kinds of gas mains, including polyethylene (PE) gas main, ductile iron pipe and steel pipe.
4. Level	3
5. Credits	9
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of underground gas main maintenance and repair</p> <ul style="list-style-type: none"> ◆ Understand the location of pipe installation and the requirements on pipe support and protection ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed ◆ Understand the readings of underground gas main cathode protection ◆ Understand underground public utilities plans ◆ Distinguish different public utilities ◆ Know about the industrial safety knowledge relevant to gas main laying <p>6.2 Methods and procedures of underground gas main maintenance and repair</p> <ul style="list-style-type: none"> ◆ Carry out live gas connection ◆ Judge the outward appearance of the underground gas main and carry out repair of different degrees ◆ Operate the WASK bagging system ◆ Use pipe and cable locator to locate the exact position of the underground gas main ◆ Remove water or heavy oil from the underground gas main ◆ Use leakage detection equipment correctly for gas supply network inspection ◆ Locate the leakage

	<p>6.3 Professional knowledge and responsibilities for underground gas main maintenance and repair</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Gas Production and Supply Code of Practice GPS01 [Avoiding danger from gas pipes] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to carry out routine maintenance, repair and emergency repair on general road service for all kinds of gas mains, including polyethylene (PE) gas main, ductile iron pipe and steel pipe.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 , EMGAIT209A 【Install gas mains (steel pipes)】 , EMGAIT210A 【Install and lay gas mains (ductile iron pipes)】 , EMGAIT212A 【Install and lay gas mains (automatic butt fusion method)】 and EMGAIT203A 【Install and lay gas mains (electro fusion method)】 .</p>

1. Title	Maintain and repair LPG supply system
2. Code	EMGAOR304A
3. Range	Maintain and repair LPG supply system equipment including gas pipe, liquid pipe, pressure regulator, vaporizer, underground LPG tank and equipment on the tank surface.
4. Level	3
5. Credits	9
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of maintaining and repairing LPG supply system</p> <ul style="list-style-type: none"> ◆ Understand the physical properties of LPG in liquid form ◆ Assess the risk of explosion during the LPG supply system maintenance and repair ◆ Use multi-meter correctly to measure the resistance, current and voltage of circuit ◆ Use ammeter correctly to measure current of power line ◆ Use insulation meter to measure insulation resistance of power line ◆ Use phase meter correctly to measure phase sequence of the three-phase power source ◆ Understand various parts of LPG supply system ◆ Understand the work flow of LPG supply system ◆ Understand the functions and operating principles of underground LPG tank and valve equipment on the tank surface <p>6.2 Methods and procedures of maintaining and repairing LPG supply system</p> <ul style="list-style-type: none"> ◆ Test the pressure test for various parts of the LPG supply system regularly (including high pressure pipe, medium pressure pipe, vaporizer, etc.) ◆ Calibrate the gas detection system correctly ◆ Regulate the gas supply pressure of primary regulator

	<ul style="list-style-type: none"> ◆ Regulate the gas supply pressure of 2nd stage regulator and the set point of over and under pressure cut-off ◆ Repair faults of the vaporizer ◆ Measure the cathode protection readings of the underground LPG tank correctly ◆ Repair the gas detection system correctly <p>6.3 Professional knowledge and responsibilities for maintaining and repairing LPG supply system</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply other gas related regulations and codes of practice ◆ Understand the classification of hazard zone
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to repair faults of the vaporizer; (ii) Capable to regulate the gas supply pressure of the secondary regulator and the set point of over and under pressure cut-off; and (iii) Capable to test the pressure of the LPG supply system.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】, EMGAOR203A 【Maintain and repair domestic gas appliances】 and EMGAOR202A 【Maintain and repair gas service pipe】.</p>

1. Title	Maintain and repair commercial and industrial gas appliances
2. Code	EMGAOR305A
3. Range	Maintain and repair commercial and industrial gas appliances.
4. Level	3
5. Credits	10
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of commercial and industrial gas appliance maintenance and repair</p> <ul style="list-style-type: none"> ◆ Use a multi-meter correctly to measure the resistance, current and voltage of circuit ◆ Use an clamp ammeter correctly to measure current of power line ◆ Use a insulation meter to measure insulation resistance of power line ◆ Use a multi-meter correctly to measure the circuit of commercial and industrial gas appliance ◆ Explain the structure of various types of commercial and industrial gas appliances <p>6.2 Methods and procedures of commercial and industrial gas appliance maintenance and repair</p> <ul style="list-style-type: none"> ◆ Operate instruments to check whether the exhaust meets the requirements ◆ Repair the mechanical faults of commercial and industrial gas appliances ◆ Repair the electronic faults of commercial and industrial gas appliances ◆ Commission the commercial and industrial gas appliances correctly ◆ Decommission the commercial and industrial gas appliances correctly ◆ Operate the gas detector correctly ◆ Locate and repair the leakage

	<p>6.3 Professional knowledge and responsibilities for commercial and industrial gas appliance maintenance and repair</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Gas Utilisation Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU12 on [Installation of Mechanical Exhaust System for Gas Appliances] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to repair a commercial and industrial mechanical gas appliance with several faults; and (ii) Capable to repair a commercial and industrial electrical gas appliance with several faults.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 , EMGAOR202A 【Maintain and repair gas service pipes】 and EMGAOR203A 【Maintain and repair domestic gas appliances】 .</p>

1. Title	Maintain and repair Towngas off-take
2. Code	EMGAOR306A
3. Range	Maintain and repair the Towngas off-take.
4. Level	3
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of maintaining and repairing Towngas off-take</p> <ul style="list-style-type: none"> ◆ Understand the operation flow of off-take ◆ Understand the functions of various equipment and valves in the off-take ◆ Use a multi-meter correctly to measure the resistance, current and voltage of circuit <p>6.2 Methods and procedures of maintaining and repairing Towngas off-take</p> <ul style="list-style-type: none"> ◆ Check and repair faults of pressure regulator in the off-take ◆ Operate various equipment and valves in the off-take correctly <p>6.3 Professional knowledge and responsibilities for maintaining and repairing Towngas off-take</p> <ul style="list-style-type: none"> ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to repair pressure regulators in the Towngas off-take.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Handle general gas leakage in underground gas mains	
2. Code	EMGAOR307A	
3. Range	Handle general gas leakage accidents of underground gas mains.	
4. Level	3	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling general gas leakage in underground gas mains</p> <ul style="list-style-type: none"> ◆ Understand the design, path and main switch position of underground gas supply system ◆ Understand underground public utility records ◆ Distinguish different communal facilities ◆ Know about industrial safety knowledge relevant to gas mains <p>6.2 Methods and procedures of handling general gas leakage in underground gas mains</p> <ul style="list-style-type: none"> ◆ Judge the seriousness of leakage and take appropriate steps at once ◆ Close the gas supply valve correctly to stop gas supply ◆ Operate handheld gas detector correctly ◆ Use the handheld gas detector to locate the leakage ◆ Cooperate with the firemen and police on spot ◆ Ensure the safety of lives and properties when the leakage is out of control <p>6.3 Professional knowledge and responsibilities for handling general gas leakage in underground gas mains</p> <ul style="list-style-type: none"> ◆ Know about the basic legislations and regulations relevant to underground utility installation ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Gas Production and Supply Code of Practice GPS01 [Avoiding danger from gas pipes] 	

	<p>◆ Apply other gas related regulations and codes of practice</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to handle general gas leakage accidents of underground gas mains.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAOR301A 【Handle general gas leakage in premises】 .</p>

1. Title	Control general gas leakage in LPG supply system and LPG vehicle filling station	
2. Code	EMGAOR308A	
3. Range	Handle general gas leakage in LPG supply system and LPG vehicle filling station.	
4. Level	3	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling general gas leakage in LPG supply system and LPG vehicle filling station</p> <ul style="list-style-type: none"> ◆ Understand the design, path and main switch position of underground gas supply system ◆ Understand the functions of major LPG vehicle tank components <p>6.2 Methods and procedures of handling general gas leakage in LPG supply system and LPG vehicle filling station</p> <ul style="list-style-type: none"> ◆ Judge the seriousness of leakage and take appropriate steps at once ◆ Use handheld gas detector to locate the leakage ◆ Cooperate with the firemen and police on spot ◆ Control and evacuate the public on the street correctly when the leakage is out of control ◆ Close the gas supply valve correctly to stop gas supply ◆ Operate handheld gas detector correctly ◆ Operate input and output valves of LPG vehicle correctly <p>6.3 Professional knowledge and responsibilities for handling general gas leakage in LPG supply system and LPG vehicle filling station</p> <ul style="list-style-type: none"> ◆ Follow the manufacturer's and technical instructions to install equipment to meet the explosion-proof specifications ◆ Understand the classification of hazard zone 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to handle general gas leakage in LPG supply system and LPG vehicle filling station.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAOR301A 【Handle general gas leakage in premises】 .

1. Title	Repair, test and evaluate functions of gas equipment of road tanker	
2. Code	EMGAOR309A	
3. Range	Repair, test and evaluate functions of gas equipment of road tanker.	
4. Level	3	
5. Credits	7	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of repairing, testing and evaluating functions of gas equipment of road tanker</p> <ul style="list-style-type: none"> ◆ Understand how to avoid frostbite caused by LPG ◆ Know about LPG system equipment of LPG road tanker ◆ Operate various machines of LPG road tanker ◆ Identify gas leakage <p>6.2 Methods and procedures of repairing, testing and evaluating functions of gas equipment of road tanker</p> <ul style="list-style-type: none"> ◆ Identify faults of LPG road tanker equipment including internal valve, LPG pump, level device, flowmeter and all kinds of valves ◆ Point out the causes of faults ◆ Point out the repairing methods of faults <p>6.3 Professional knowledge and responsibilities for repairing, testing and evaluating functions of gas equipment of road tanker</p> <ul style="list-style-type: none"> ◆ Know about the potential hazards during the operation of LPG road tanker, and choose suitable personal protective equipment ◆ Master industrial safety knowledge relevant to road tanker 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to repair, test and evaluate functions of gas equipment of road tanker.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Maintain and repair Towngas off-take
2. Code	EMGAOR310A
3. Range	Maintain and repair the Towngas off-take.
4. Level	3
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of maintaining and repairing Towngas off-take</p> <ul style="list-style-type: none"> ◆ Understand the operation flow of off-take ◆ Understand the functions of various equipment and valves in the off-take ◆ Use multi-meter correctly to measure the resistance, current and voltage of circuit <p>6.2 Methods and procedures of maintaining and repairing Towngas off-take</p> <ul style="list-style-type: none"> ◆ Check and repair faults of pressure regulator in the off-take ◆ Operate various equipment and valves in the off-take correctly <p>6.3 Professional knowledge and responsibilities for maintaining and repairing Towngas off-take</p> <ul style="list-style-type: none"> ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to repair pressure regulators in the Towngas off-take.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Building services supervision at work site	
2. Code	EMGAPM301A	
3. Range	Work with various contractors at commercial and residential building work site to ensure smooth completion of gas work.	
4. Level	3	
5. Credits	9	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of building services supervision at work site</p> <ul style="list-style-type: none"> ◆ Understand the draining, blowdown, exhaust, water and power (single-phase and three-phase) supply systems for commercial and industrial building projects ◆ Understand the concept of site work ◆ Understand the safety requirements on site work ◆ Be familiar with building services system <p>6.2 Methods and procedures of building services supervision at work site</p> <ul style="list-style-type: none"> ◆ Work with various contractors to ensure smooth completion of the gas work ◆ Estimate completion time accurately ◆ Work according to the engineering requirements ◆ Supervise the work until it completes according to the required standards ◆ Liaise with and request various contractors to report on the progress ◆ Formulate work schedule ◆ Draw operation flow chart and time sequence chart ◆ Instruct the workers on work safety and help the subordinates to implement safety measures ◆ Provide all kinds of support to the contractors, including technical support, manpower allocation, engineering coordination and hardware facilities, etc. 	

	<p>6.3 Professional knowledge and responsibilities for building services supervision at work site</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to work with various contractors at commercial and residential building work site to ensure smooth completion of gas work.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Handle LPG vehicle failure safely	
2. Code	EMGAOM301A	
3. Range	Handle urgent failures of LPG vehicles, such as failure of parts, gas leakage and fire outbreak, in the LPG filling station to avoid affecting the filling station operation or causing more serious accident.	
4. Level	3	
5. Credits	4	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling LPG vehicle failure safely</p> <ul style="list-style-type: none"> ◆ Understand the whole gas supply system of LPG vehicle ◆ Understand the whole LPG filling station system ◆ Master general fire safety knowledge ◆ Use dry powder fire extinguisher correctly <p>6.2 Methods and procedures of handling LPG vehicle failure safely</p> <ul style="list-style-type: none"> ◆ Press the emergency shut-down button correctly to stop the operation of the whole LPG filling station system ◆ Judge the seriousness of the LPG vehicle failure and its influence on the filling station, and take necessary steps to handle it ◆ Close input and output valves correctly ◆ Inform departments concerned correctly to follow up ◆ Control the on-site situation <p>6.3 Professional knowledge and responsibilities for handling LPG vehicle failure safely</p> <ul style="list-style-type: none"> ◆ Apply other gas related regulations and codes of practice 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to handle urgent failures of LPG vehicles, such as failure of parts, gas leakage and fire outbreak, in the LPG filling station to avoid affecting the filling station operation or causing more serious accident.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Handle complaints and understand the situations
2. Code	EMGAOM302A
3. Range	Handle complaints lodged by phone or in person at LPG distributor's sales points, record the incidents after understanding the situations, and come up with solutions accordingly.
4. Level	3
5. Credits	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling complaints and understanding the situations</p> <ul style="list-style-type: none"> ◆ Point out the points to note for using gas appliances ◆ Understand the operation of general gas appliances ◆ Understand the safety requirements on general gas appliances <p>6.2 Methods and procedures of handling complaints and understanding the situations</p> <ul style="list-style-type: none"> ◆ Raise suitable questions to understand why the customer complains and how the incident happened ◆ Listen to the customer quietly and record the details ◆ Calm down the customer ◆ Master the customer's psychology ◆ Make timely decision to handle the issue in complaint ◆ Report to the superior correctly ◆ Analyze the incident and make correct judgement
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Handle complaints lodged by phone or in person at LPG distributor's sales points, record the incidents after understanding the situations, and come up with solutions accordingly.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Schedule and arrange overhaul for gas supply network	
2. Code	EMGAOM303A	
3. Range	Schedule and arrange an overhaul for the gas supply network.	
4. Level	3	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of scheduling and arranging overhaul for gas supply network</p> <ul style="list-style-type: none"> ◆ Understand the consumption pattern of gas supply network ◆ Understand the repairing procedures and time needed for gas supply network ◆ Understand the distribution of piping materials of gas supply network in different districts ◆ Understand the service life of piping materials so as to plan and arrange overhaul for gas supply network <p>6.2 Methods and procedures of scheduling and arranging overhaul for gas supply network</p> <ul style="list-style-type: none"> ◆ Coordinate various departments of the company to make contingencies for the overhaul ◆ Coordinate and inform in advance the users being affected ◆ Apply to all relevant government departments in advance ◆ Consolidate and keep proper record of the inspection report <p>6.3 Professional knowledge and responsibilities for scheduling and arranging overhaul for gas supply network</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to schedule and arrange an overhaul for the gas supply network.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Arrange to carry out engineering work safely in explosion-proof and hazard zones
2. Code	EMGASH301A
3. Range	Understand clearly the classification of explosion-proof and hazard zones, how dangerous they are, and the potential hazards of the engineering process; arrange the engineering work to be carried out safely in explosion-proof and hazard zones.
4. Level	3
5. Credits	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of arranging to carry out engineering work safely in explosion-proof and hazard areas</p> <ul style="list-style-type: none"> ◆ Understand the effects of explosion-proof principles on engineering safety ◆ Master industrial safety knowledge relevant to explosion-proof and hazard zones ◆ Understand the classification of hazard zone ◆ Master general fire safety knowledge <p>6.2 Methods and procedures of arranging to carry out engineering work safely in explosion-proof and hazard zones</p> <ul style="list-style-type: none"> ◆ Compare the effects of physical properties of Towngas, LPG and natural gas on the safety of explosion-proof and hazard zones ◆ Identify the danger category, level and temperature group of Towngas, LPG and natural gas ◆ Select suitable explosion-proof electrical equipment for different kinds of dangerous environment ◆ Point out the installation requirements on different kinds of explosion-proof electrical equipment

	<p>6.3 Professional knowledge and responsibilities for arranging to carry out engineering work safely in explosion-proof and hazard zones</p> <p>◆ Apply relevant gas safety regulations and codes of practice</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to select suitable explosion-proof electrical equipment for different kinds of dangerous environment, and arrange to carry out engineering work safely in explosion-proof and hazard zones.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Arrange and monitor engineering work to be carried out safely
2. Code	EMGASH302A
3. Range	Arrange and monitor the engineering work to be carried out safely.
4. Level	3
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of arranging and monitoring engineering work to be carried out safely</p> <ul style="list-style-type: none"> ◆ Master industrial safety knowledge ◆ Master basic knowledge of crisis observation and management <p>6.2 Methods and procedures of arranging and monitoring engineering work to be carried out safely</p> <ul style="list-style-type: none"> ◆ Formulate and implement work safety guidelines ◆ Recommend on the occupational safety management system ◆ Assess the potential crises and relevant risks for the engineering work ◆ Arrange and provide a safe working environment ◆ Monitor the workers to work safely <p>6.3 Professional knowledge and responsibilities for arranging and monitoring engineering work to be carried out safely</p> <ul style="list-style-type: none"> ◆ Apply relevant gas safety regulations and codes of practice

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to arrange a safe working environment and monitor the workers to ensure that the engineering work is carried out safely.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Make LPG road tanker and cylinder wagon travel safely on the road	
2. Code	EMGASH303A	
3. Range	Formulate the code of safety for LPG road tanker and cylinder wagon to ensure that they travel safely on the road.	
4. Level	3	
5. Credits	3	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of making LPG road tanker and cylinder wagon travel safely on the road</p> <ul style="list-style-type: none"> ◆ Know about the potential hazards of LPG road tanker machine operation, and select suitable personal protective equipment ◆ Know the causes of static electricity to LPG road tankers and how to prevent electrostatic accidents ◆ Master the handling of gas leakage ◆ Master general fire safety knowledge ◆ Understand how to avoid frostbite caused by LPG ◆ Master industrial safety knowledge relevant to road tanker <p>6.2 Methods and procedures of making LPG road tanker and cylinder wagon travel safely on the road</p> <ul style="list-style-type: none"> ◆ Open and close the LPG road tanker valves correctly ◆ Connect and disconnect the earthing cable correctly ◆ Connect and disconnect the off-loading hose correctly ◆ Start and stop the off-loading pump correctly ◆ Operate the fixed contents gauge correctly ◆ Read the flowmeter readings correctly ◆ Use dry powder fire extinguisher correctly 	

	<p>6.3 Professional knowledge and responsibilities for making LPG road tanker and cylinder wagon travel safely on the road</p> <ul style="list-style-type: none"> ◆ Apply all relevant provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all relevant provisions in the Code of Practice for Hong Kong LPG Industry: Module 3 [Handling and Transport of LPG in Bulk by Road] ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to formulate the code of safety for LPG road tanker and cylinder wagon to ensure that they travel safely on the road.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Investigate general industrial accidents
2. Code	EMCUSH305A
3. Range	Investigate industrial accidents related to electrical and mechanical services and propose solutions to improve occupational safety and health, and be capable to write accident investigation reports.
4. Level	3
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 General industrial accident investigation</p> <ul style="list-style-type: none"> ◆ Understand procedures for industrial accident investigation, including investigating by accident type, recording the happening of accident, collecting information and reporting the accident to relevant departments <p>6.2 Handle industrial accidents</p> <ul style="list-style-type: none"> ◆ Investigate industrial accidents related to electrical and mechanical services <ul style="list-style-type: none"> • Be capable to handle and investigate industrial accidents related to electrical and mechanical services according to the code of practice required for handling industrial accidents, including informing employers concerned, the Labour Department, the police and the families of the victims; filling in declaration form; investigating and recording the people, place, time and date, the machinery involved, the course of the accident, causes for it, etc. • Use objective methods and techniques to investigate and collect information. The investigation work include on-the-spot investigation, interviewing the victims/witnesses in person or on the phone, using questionnaire, etc.

	<ul style="list-style-type: none"> ◆ Report the accident to relevant departments ◆ Assist relevant departments to investigate the accident ◆ Improvement plans <ul style="list-style-type: none"> • Make improvement plans to reduce similar industrial accidents • Understand the causes of industrial accidents and ways of prevention ◆ Write accident investigation reports <ul style="list-style-type: none"> • Understand the document format and wording required and write accident investigation reports
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to handle and investigate industrial accidents related to electrical and mechanical services according to the code of practice required for handling industrial accidents, to make improvement plans and write accident investigation reports.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic occupational safety knowledge.</p>

1. Title	Implement quality control and quality assurance	
2. Code	EMCUQM303A	
3. Range	Implement quality control and quality assurance according to engineering procedures for electrical and mechanical services to achieve high quality engineering performance.	
4. Level	3	
5. Credit	4	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Engineering procedures and quality control points of electrical and mechanical services</p> <ul style="list-style-type: none"> ◆ Understand the engineering procedures for electrical and mechanical services ◆ Understand quality monitoring points of each engineering procedure, including the electrical and mechanical installation procedure, inspection procedure, debugging procedure, commissioning procedure and servicing procedure ◆ Understand the quality control system of the organization and ensure that the service quality meet the requirements, including: <ul style="list-style-type: none"> • Ensuring that the engineering procedures meet the quality requirements and performance indicators • Confirming and rectifying procedures not complying with regulations • Organize teams to formulate quality improvement plans <p>6.2 Implement quality control and quality assurance</p> <ul style="list-style-type: none"> ◆ Follow the quality management scheme, quality assurance procedures and verification specifications to implement quality assurance ◆ Strictly examine the major monitoring points of each engineering procedure to ensure the quality performance of procedures 	

	<ul style="list-style-type: none"> ◆ Record various engineering quality problems and report to the management through the communication mechanism
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to implement quality control and quality assurance system, master the verification specifications and examine the major monitoring points of each engineering procedure to ensure the quality performance.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of quality management.</p>

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to compile quality assurance reports on electrical and mechanical services and formulate simple quality assurance plan.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of quality management.

1. Title	Sell gas appliances to commercial and industrial customers	
2. Code	EMGAMS301A	
3. Range	Sell gas appliances to commercial and industrial customers.	
4. Level	3	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of selling gas appliances to commercial and industrial customers</p> <ul style="list-style-type: none"> ◆ Understand different types of commercial and industrial gas appliances, their applications and structure ◆ Master sales techniques, understand customers' needs and recommend suitable gas appliances to them <p>6.2 Methods and procedures of selling gas appliances to commercial and industrial customers</p> <ul style="list-style-type: none"> ◆ List the noting points for using different types of commercial and industrial gas appliances ◆ Point out restrictions on the installation and use of different commercial and industrial gas appliances ◆ Point out different types of commercial and industrial gas appliances ◆ Point out the characteristics of different commercial and industrial gas appliances ◆ Point out the specifications and installation requirements for different commercial and industrial gas appliances ◆ Point out the advantages and disadvantages of different gases and other sources of energy ◆ Point out the correct use of different commercial and industrial gas appliances ◆ Point out the advantages and disadvantages of different commercial and industrial gas appliances ◆ Point out how to handle gas leakage 	

	<p>6.3 Professional knowledge and responsibilities for selling gas appliances to commercial and industrial customers</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51, and answer customer enquiries on the installation of commercial and industrial gas appliances ◆ Apply all the provisions in the Gas Utilisation Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises], and answer customer enquiries on the installation of commercial and industrial gas appliances ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU12 on [Installation of Mechanical Exhaust System for Gas Appliances], and answer customer enquiries on the installation of commercial and industrial gas appliances ◆ Apply other relevant legislations and codes of practice, and answer customer enquiries on the installation of commercial and industrial gas appliances
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to point out the advantages and disadvantages of different commercial and industrial gas appliances, and recommend suitable ones to customers; and (ii) Capable to answer customer enquiries correctly on the use and installation of commercial and industrial gas appliances.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

Competency Level 4

1. Title	Design general commercial and industrial flue gas appliances
2. Code	EMGADE401A
3. Range	Design for customers general commercial and industrial flue gas appliances and other accessories in a cost-effective way for commercial and industrial premises and different commercial and industrial application environment according to customers' needs as well as the requirements of the gas safety regulation and codes of practice; design the installation of these appliances and accessories according to the commercial and industrial application environment; take the initiative to accomplish the design task independently and brief the engineering personnel or people concerned on the engineering details; and provide special solutions for non-routine engineering environment.
4. Level	4
5. Credits	8
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing general commercial and industrial flue gas appliances</p> <ul style="list-style-type: none"> ◆ Calculate the required air volume of the commercial and industrial flue gas appliances ◆ Calculate the heat efficiency and work out solutions ◆ Point out the pros and cons of different combustion methods ◆ Select suitable materials for production of exhaust system flue ◆ Calculate the air volume required for gas appliance combustion correctly ◆ Calculate the pressure loss of the exhaust flue correctly ◆ Calculate the differential pressure inside the exhaust flue correctly ◆ Use instruments correctly to measure the wind speed and calibrate accordingly ◆ Use instruments correctly to measure the noise and calibrate accordingly ◆ Draw the working drawing of the exhaust flue

	<p>6.2 Methods and procedures of designing general commercial and industrial flue gas appliances</p>	<ul style="list-style-type: none"> ◆ Design safety devices such as flame failure safety device, anti-lightback device, overflow and water-low cut-off device, over and under pressure cut-off device, pressure relief device, etc., to ensure that the gas appliance meets the safety requirements ◆ Select correct burner and accessories for the commercial and industrial gas appliance such as air blower, supercharger, check valve, etc. ◆ Use gas analyser to measure correctly the content of carbon monoxide and carbon dioxide in the exhaust, temperature of the exhaust, etc., analyze the combustion situation and calibrate accordingly for the gas appliance to achieve the best performance ◆ Select exhaust fan correctly with appropriate capacity ◆ Look up in the friction loss table correctly the exhaust flue dimensions required for the commercial and industrial gas appliances
	<p>6.3 Professional knowledge and responsibilities for designing general commercial and industrial flue gas appliances</p>	<ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU12 on [Installation of Mechanical Exhaust System for Gas Appliances] ◆ Apply other gas related regulations and codes of practice

	<ul style="list-style-type: none"> ◆ Apply Guidelines of the Environmental Protection Department [Control of Oily Fume and Cooking Odour from Restaurants and Food Business] ◆ Apply the Air Pollution Control Ordinance ◆ Apply the Air Pollution Control (Furnaces, Ovens and Chimneys) (Installation and Alteration) Regulations ◆ Apply the provisions in the Building (Ventilating Systems) Regulations under the Buildings Ordinance ◆ Apply the provisions in the Building (Ventilating Systems) Regulations ◆ Apply the Waterworks Ordinance ◆ Apply the Fire Services Ordinance ◆ Apply the Fire Safety (Buildings) Ordinance ◆ Apply the Fire Safety (Commercial Premises) Ordinance
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design general commercial and industrial flue gas appliances and their installation methods, including calculating exhaust flue dimensions and selecting the exhaust fan type, according to the market and customer needs.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】, EMGAIT302A【Install and commission commercial and industrial gas appliances】 and EMGADE402A 【Design general commercial and industrial flueless gas appliances】</p>

1. Title	Design general commercial and industrial flueless gas appliances
2. Code	EMGADE402A
3. Range	Design for customers general commercial and industrial flueless gas appliances and other accessories in a cost-effective way for commercial and industrial premises and different commercial and industrial application environment according to customers' needs as well as the requirements of the gas safety regulation and codes of practice; design the installation of these appliances and accessories according to the commercial and industrial application environment; take the initiative to accomplish the design task independently and brief the engineering personnel or people concerned on the engineering details; and provide special solutions for non-routine engineering environment.
4. Level	4
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing general commercial and industrial flueless gas appliances</p> <ul style="list-style-type: none"> ◆ Calculate the required air volume of the commercial and industrial flue gas appliances ◆ Calculate the heat efficiency and work out solutions ◆ Point out and compare the pros and cons of different combustion methods ◆ Design safety devices such as flame failure safety device, anti-lightback device, overflow and water-low cut-off device, over and under pressure cut-off device, pressure relief device, etc., to ensure that the gas appliance meets the safety requirements ◆ Select correct burner and accessories for the commercial and industrial gas appliance such as air blower, supercharger, check valve, etc.

		<ul style="list-style-type: none"> ◆ Master the principles and operation of gas analyser to interpret correctly information such as the content of carbon monoxide and carbon dioxide in the exhaust, temperature of the exhaust, etc.; analyze the combustion situation and make improvement accordingly for the gas appliance to achieve the best performance
6.2	Methods and procedures of designing general commercial and industrial flueless gas appliances	<ul style="list-style-type: none"> ◆ Organize and interpret the requirements of customer's industrial process, and list the required specifications of the gas appliances ◆ Consider and evaluate the characteristics of the work site for installation, and come up with a comprehensive solution for flueless gas appliance installation with reference to customer's industrial process and safety requirements on various aspects ◆ Draw the working drawing and installation drawing of the gas appliances
6.3	Professional knowledge of designing general commercial and industrial flueless gas appliances	<ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU12 on [Installation of Mechanical Exhaust System for Gas Appliances] <ul style="list-style-type: none"> • Apply the Waterworks Ordinance • Apply the Fire Services Ordinance • Apply other gas related regulations and codes of practice

7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to organize and interpret the requirements of customer' s industrial process, and provide a safe and comprehensive solution for flueless gas appliance installation.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAIT302A【Install and commission commercial and industrial gas appliances】 .</p>

1. Title	Design low pressure gas piping network and relevant pressure regulation control equipment
2. Code	EMGADE403A
3. Range	Design low pressure gas piping network and relevant pressure regulation control equipment in a cost-effective way for gas piping network in roads according to present needs and future development as well as the requirements of the gas safety regulation and Code of practice and codes of practice; take the initiative to accomplish the design task independently, coordinate with other public utilities and relevant government departments, and brief the engineering personnel or people concerned on the engineering details.
4. Level	4
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing low pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Understand different properties and range of application of the following pipes: <ul style="list-style-type: none"> • Polyethylene (PE) pipe • Seamless steel pipe (Schedule 80) • Ductile iron pipe • Galvanised pipe ◆ Understand underground public utilities plans ◆ List the advantages and disadvantages of different pressure regulation control equipment ◆ Understand the operation and limitations on the use of electro fusion method to connect PE pipes ◆ Understand the operation and limitations on the use of automatic butt fusion method to connect PE pipes ◆ Understand the purpose and restrictions on the use of cathodic protection ◆ Point out the protection requirements correctly on underground pipes, including anti-corrosion, road surface pressure and mechanical damage, etc.

	<p>6.2 Methods and procedures of designing low pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Design a low pressure gas piping network with suitable pipe diameter and path ◆ Determine to use branches or loops for the piping network with reference to the conditions and actual situation ◆ Select pressure regulation control equipment with reference to conditions like the position for installation, amount of gas consumed, operating pressure and accuracy required ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed <p>6.3 Professional knowledge and responsibilities for designing low pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design low pressure gas piping network and relevant pressure regulation control equipment for general gas piping network in roads.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Perform installation, testing and commissioning for off-take
2. Code	EMGAIT401A
3. Range	Install, test and commission all kinds of gas equipment in the off-take.
4. Level	4
5. Credits	7
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of off-take installation, testing and commissioning</p> <ul style="list-style-type: none"> ◆ Understand the operation flow of off-take <p>6.2 Methods and procedures of off-take installation, testing and commissioning</p> <ul style="list-style-type: none"> ◆ Install pressure regulators correctly with different connection methods ◆ Install filters correctly ◆ Install the off-take correctly according to requirements and specifications ◆ Test the soundness and functions of pressure regulator ◆ Commission the off-take correctly ◆ Set the off-take outlet pressure correctly
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to install, test and commission all kinds of gas equipment in the off-take.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Analyze and make preventive routine maintenance arrangements for gas equipment
2. Code	EMGAOR401A
3. Range	Analyze regularly and make preventive routine maintenance arrangements for gas equipment such as pipework, gas appliances, etc.
4. Level	4
5. Credits	7
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of gas equipment analysis and preventive routine maintenance arrangements</p> <ul style="list-style-type: none"> ◆ Understand customers' consumption pattern ◆ Understand characteristics of all kinds of gas appliances <p>6.2 Methods and procedures of gas equipment analysis and preventive routine maintenance arrangements</p> <ul style="list-style-type: none"> ◆ Consolidate and analyze data to identify equipment or parts with higher frequency of damage ◆ Keep proper record of information about faults ◆ Formulate inspection guidelines for preventive maintenance plan ◆ Analyze the causes of frequent damage of parts ◆ Target the problem with engineering process and administrative means ◆ Implement preventive maintenance plan effectively ◆ Make recommendations for continuous improvement

	<p>6.3 Professional knowledge and responsibilities for gas equipment analysis and preventive routine maintenance arrangements</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to analyze regularly and formulate inspection guidelines for preventive maintenance plan.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Handle general gas leakage emergencies
2. Code	EMGAOR402A
3. Range	Handle general gas leakage emergencies.
4. Level	4
5. Credits	4
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling general gas leakage emergencies</p> <ul style="list-style-type: none"> ◆ Understand the reporting procedures ◆ Understand the design of gas supply system, including the path, and the locations of riser main switch and valve of manifold ◆ Understand the pipework drawing <p>6.2 Methods and procedures of handling general gas leakage emergencies</p> <ul style="list-style-type: none"> ◆ Make suitable arrangements such as evacuating the public and controlling the scene, etc. ◆ Take necessary steps to reduce as much as possible the influence and the number of customers being affected ◆ Arrange the staff to resume the gas supply as soon as possible ◆ Notify and coordinate all relevant units ◆ Stop the gas supply correctly ◆ Operate handheld gas detector correctly ◆ Locate the gas leakage ◆ Take necessary steps to reduce the danger as much as possible ◆ Arrange manpower to follow up ◆ Compile incident report for submission to the Electrical and Mechanical Services Department and relevant government departments

	<p>6.3 Professional knowledge and responsibilities for handling general gas leakage emergencies</p> <p>◆ Apply other gas related regulations and codes of practice</p>
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to take necessary steps to reduce as much as possible the influence of and the number of customers being affected by the suspension of gas supply;</p> <p>(ii) Capable to stop the gas supply correctly when there is leakage in the premises, and evacuate the public and control the scene when necessary; and</p> <p>(iii) Capable to implement suitable followup procedures, such as arranging manpower to follow up and compiling incident report for submission to the Electrical and Mechanical Services Department and relevant government departments.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Gas supply system and equipment installation project management	
2. Code	EMGAPM401A	
3. Range	Manage the gas supply system and equipment installation project, including the tasks of planning, tendering, quality and cost control, progress management, safety management, testing and commissioning.	
4. Level	4	
5. Credits	12	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of gas supply system and equipment installation project management</p> <ul style="list-style-type: none"> ◆ Understand the installation procedures of gas supply system and equipment ◆ Understand the sewage, fire service, water and power supply (single-phase and three-phase) systems ◆ Be familiar with building services system ◆ Understand the principles of explosion-proof and criteria for the classification of hazard zone <p>6.2 Methods and procedures of gas supply system and equipment installation project management</p> <ul style="list-style-type: none"> ◆ Control the progress of the major gas supply system and equipment installation work in order to keep up with the construction work progress ◆ Control the engineering costs of the gas supply system and equipment installation according to the preset budget ◆ Estimate time of completion for gas supply system and equipment installation ◆ Assess the risks of the gas supply system and equipment installation work ◆ Control the work safety of the gas supply system and equipment installation ◆ Plan the manpower need for the gas supply system and equipment installation work ◆ Coordinate with other companies and relevant government departments 	

	<p>6.3 Professional knowledge and responsibilities for gas supply system and equipment installation project management</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply the Code of Practice for Hong Kong LPG Industry: Module 2 [Underground LPG Pipework] ◆ Apply other gas related regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Manage the gas supply system and equipment installation project.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Risk assessment of gas engineering processes	
2. Code	EMGASH401A	
3. Range	Perform risk assessment for all kinds of engineering processes relevant to the gas industry.	
4. Level	4	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of risk assessment of gas engineering processes</p> <ul style="list-style-type: none"> ◆ Understand thoroughly the engineering processes of the gas industry ◆ Understand thoroughly the working environment of the gas industry ◆ Know about the methods and principles of risk assessment <p>6.2 Methods and procedures of risk assessment of gas engineering processes</p> <ul style="list-style-type: none"> ◆ Determine the possible risks caused by the hazards of various kinds of work and engineering processes ◆ Class the risks of various kinds of work and engineering processes by their level of seriousness ◆ Categorize various kinds of work and engineering processes in the gas industry ◆ Identify the hazards of various kinds of work and engineering processes (including the materials, procedures or equipment) ◆ Formulate risk control plans to minimize the risks to an acceptable level ◆ Compile risk assessment reports correctly 	

	<p>6.3 Professional knowledge and responsibilities for risk assessment of gas engineering processes</p> <ul style="list-style-type: none"> ◆ Apply relevant gas safety regulations and codes of practice ◆ Apply the relevant Factories and Industrial Undertakings Ordinance
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform risk assessment for all kinds of engineering processes relevant to the gas industry.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Implement quality management in electrical and mechanical engineering services
2. Code	EMCUQM402A
3. Range	Plan, organize and control effectively the working procedures prior to and during the project so as to achieve the result of minimal cost and high quality for electrical and mechanical project.
4. Level	4
5. Credit	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Division of procedure for electrical and mechanical installation project</p> <ul style="list-style-type: none"> ◆ Understand and analyze the division of process for electrical and mechanical installation project; set the following for quality control before the project starts: <ul style="list-style-type: none"> • Check points for different stages of the project • Quality management goals such as completion dates for different stages of the project, alert level for the number of items not conforming to the plan, accident rate, productivity, etc. <p>6.2 Implement the quality management plan and organized working procedure of the quality control system effectively</p> <ul style="list-style-type: none"> ◆ Confirm and analyze items not conforming to the rules at different stages of the project, and formulate improvement plans with working teams concerned ◆ Performance indicators for different stages of the project should be set with reference to level of performance specified by the contract, code of practice, and international standards, etc. ◆ Formulate quality management plan, including the following, to control procedure costs and quality in an organized and effective way: <ul style="list-style-type: none"> • Division of procedure for the project • Check points of ‘planning-implementation-commissioning-rectification’ for quality management at different stages of the project • Performance indicators at different stages of the project

	<ul style="list-style-type: none"> • Ways to handle items not conforming to the rules • Quality management goals • Mechanism to communicate with relevant teams and formulation of timetables for improvement plans, etc.
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to formulate quality management plans effectively, monitor project quality, control costs and improve process not conforming to the rules.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic concept of quality management.</p>

1. Title	Manage gas loading/unloading procedures	
2. Code	EMGAGS401A	
3. Range	Manage the gas loading/unloading procedures.	
4. Level	4	
5. Credits	4	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of managing gas loading/unloading procedures</p> <ul style="list-style-type: none"> ◆ Understand the gas loading/unloading procedures <p>6.2 Methods and procedures of managing gas loading/unloading procedures</p> <ul style="list-style-type: none"> ◆ Formulate the LPG loading/unloading procedures from the LPG vessel to the LPG compound ◆ Formulate the LPG loading/unloading procedures from the LPG compound to the LPG road tanker ◆ Formulate the LPG loading/unloading procedures from the LPG road tanker to the underground tank ◆ Manage the LPG loading/unloading procedures from the LPG vessel to the LPG compound ◆ Manage the LPG loading/unloading procedures from the LPG compound to the LPG road tanker ◆ Manage the LPG loading/unloading procedures from the LPG road tanker to the underground tank <p>6.3 Professional knowledge and responsibilities for managing gas loading/unloading procedures</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice 	

7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to formulate and manage the LPG loading/unloading procedures from the LPG vessel to the LPG compound; (ii) Capable to formulate and manage the LPG loading/unloading procedures from the LPG compound to the LPG road tanker; and (iii) Capable to formulate and manage the LPG loading/unloading procedures from the LPG road tanker to the underground tank.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

Competency Level 5

1. Title	Design commercial and industrial gas supply system (service pipes and relevant equipment)
2. Code	EMGADE501A
3. Range	Design suitable gas service pipes and choose relevant equipment correctly for customers in a cost-effective way for commercial and industrial premises to be built or different commercial and industrial application environment according to customers' needs as well as the requirements of the gas safety regulation and codes of practice; take the initiative to accomplish the design task independently and brief the engineering personnel or people concerned on the engineering details; and choose and provide special solutions for non-routine engineering environment.
4. Level	5
5. Credits	4
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing commercial and industrial gas supply system (service pipes and relevant equipment)</p> <ul style="list-style-type: none"> ◆ Understand the engineering processes of industry and commerce and consumption patterns of different trades ◆ Draw the pipework drawing ◆ Understand the construction plan <p>6.2 Methods and procedures of designing commercial and industrial gas supply system (service pipes and relevant equipment)</p> <ul style="list-style-type: none"> ◆ Select and use suitable equipment e.g. expansion joints, insulated socket, etc. ◆ Design the gas piping path ◆ Calculate the power and total gas consumption of the commercial and industrial gas appliances and their applied coefficient when using at the same time ◆ Calculate correctly to select pipes with suitable diameters ◆ Design commercial and industrial Towngas service pipes correctly

	<p style="text-align: right;"> ◆ Design commercial and industrial LPG service pipes correctly ◆ Design the pressurized distribution network of the gas supply system </p> <p>6.3 Professional knowledge and responsibilities for designing commercial and industrial gas supply system (service pipes and relevant equipment)</p> <p style="text-align: right;"> ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply all the provisions in the Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply other gas related regulations and codes of practice </p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design suitable gas service pipes and choose relevant equipment correctly in a cost-effective way for commercial and industrial application environment.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGADE301A 【Design domestic gas supply system (service pipes and relevant equipment)】 .</p>

1. Title	Design special types of commercial and industrial gas application systems	
2. Code	EMGADE502A	
3. Range	Design special types of commercial and industrial gas application systems for customers in a cost-effective way for commercial and industrial premises to be built or different commercial and industrial application environment according to customers' needs as well as the requirements of the gas safety regulation and codes of practice; take the initiative to accomplish the design task independently and brief the engineering personnel or people concerned on the engineering details; and choose and provide special solutions for non-routine engineering environment.	
4. Level	5	
5. Credits	5	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing special types of commercial and industrial gas application systems</p> <ul style="list-style-type: none"> ◆ Select suitable materials for production of exhaust system flue ◆ Select exhaust fan correctly with appropriate capacity ◆ Calculate the air volume required for gas appliance combustion ◆ Calculate the pressure loss of the exhaust flue correctly ◆ Calculate the differential pressure inside the exhaust flue correctly ◆ Use instruments correctly to measure the wind speed and calibrate accordingly ◆ Use instruments correctly to measure the noise and calibrate accordingly ◆ Draw the working drawing of the exhaust flue <p>6.2 Methods and procedures of designing special types of commercial and industrial gas application systems</p> <ul style="list-style-type: none"> ◆ Use waste heat recovery to enhance the heat efficiency of the commercial and industrial gas appliances ◆ Operate the programmable logic controller to design a control logic used in the commercial and industrial gas application system 	

	<p>6.3 Professional knowledge and responsibilities for designing special types of commercial and industrial gas application systems</p>	<ul style="list-style-type: none"> ◆ Design a control system for the commercial and industrial gas appliances ◆ Use mechanical theory to design a mechanical operation system suitable for the commercial and industrial gas appliances ◆ Design a pneumatic control system suitable for the commercial and industrial gas appliances ◆ Design safety devices such as flame failure safety device, anti-lightback device, overflow and water-low cut-off device, over and under pressure cut-off device, pressure relief device, etc., to ensure that the gas appliance meets the safety requirements ◆ Select correct burner and accessories for the commercial and industrial gas appliance such as air blower, supercharger, check valve, etc. ◆ Use gas analyser to measure correctly the content of carbon monoxide and carbon dioxide in the exhaust, temperature of the exhaust, etc., analyze the combustion situation and calibrate accordingly for the gas appliance to achieve the best performance ◆ Look up in the friction loss table correctly the exhaust flue dimensions required for the commercial and industrial gas appliances ◆ Apply all the provisions in the Gas Safety (Installation and Use) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice GU06 on [LPG Installations for Catering Purposes in Commercial Premises] ◆ Apply all the provisions in the Gas Utilisation Guidance Note GU12 on [Installation of Mechanical Exhaust System for Gas Appliances]
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	<ul style="list-style-type: none"> ◆ Apply other gas related regulations and codes of practice ◆ Apply Guidelines of the Environmental Protection Department [Control of Oily Fume and Cooking Odour from Restaurants and Food Business] ◆ Apply the Air Pollution Control Ordinance ◆ Apply the Air Pollution Control (Furnaces, Ovens and Chimneys) (Installation and Alteration) Regulations ◆ Apply the provisions in the Building (Ventilating Systems) Regulations under the Buildings Ordinance ◆ Apply the provisions in the Building (Ventilating Systems) Regulations ◆ Apply the Waterworks Ordinance ◆ Apply the Fire Services Ordinance ◆ Apply the Fire Safety (Buildings) Ordinance ◆ Apply the Fire Safety (Commercial Premises) Ordinance
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design special types of innovative commercial and industrial gas application systems for commercial and industrial application environment according to the market or customers' needs.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】, EMGAIT302A【Install and commission commercial and industrial gas appliances】, EMGADE401A 【Design general commercial and industrial flue gas appliances】 and EMGADE402A 【Design general commercial and industrial flueless gas appliances】 .</p>

1. Title	Design intermediate and medium pressure gas piping network and relevant pressure regulation control equipment
2. Code	EMGADE503A
3. Range	Design intermediate and medium pressure gas piping network and relevant pressure regulation control equipment in a cost-effective way for gas piping network in roads according to present needs and future development as well as the requirements of the gas safety regulation and codes of practice; take the initiative to accomplish the design task independently, coordinate with other public utilities and relevant government departments, and brief the engineering personnel or people concerned on the engineering details.
4. Level	5
5. Credits	4
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing intermediate and medium pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Understand different properties and range of application of the following pipes: <ul style="list-style-type: none"> • Polyethylene (PE) pipe • Seamless steel pipe (Schedule 80) • Ductile iron pipe • Galvanised pipe ◆ Understand the operation and limitations on the use of electro fusion method to connect PE pipes ◆ Understand the operation and limitations on the use of automatic butt fusion method to connect PE pipes ◆ Understand the purpose and restrictions on the use of cathodic protection ◆ Point out the protection requirements correctly on underground pipes, including anti-corrosion, road surface pressure and mechanical damage, etc. ◆ List the advantages and disadvantages of different pressure regulation control equipment ◆ Understand underground public utilities plans

	<p>6.2 Methods and procedures of designing intermediate and medium pressure gas piping network and relevant pressure regulation control equipment</p> <p>6.3 Professional knowledge and responsibilities for designing intermediate and medium pressure gas piping network and relevant pressure regulation control equipment</p>	<ul style="list-style-type: none"> ◆ Design a intermediate and medium pressure gas piping network with suitable pipe diameter and path ◆ Determine to use branches or loops for the piping network with reference to the conditions and actual situation ◆ Select pressure regulation control equipment with reference to conditions like the position for installation, amount of gas consumed, operating pressure and accuracy required ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed ◆ Apply basic legislations and regulations relevant to underground public utilities installation
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design intermediate and medium pressure gas piping network and relevant pressure regulation control equipment for general gas piping network in roads.</p>	
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGADE403A 【Design low pressure gas piping network and relevant pressure regulation control equipment】 .</p>	

1. Title	Design LPG filling station and supply system	
2. Code	EMGADE504A	
3. Range	Design a LPG filling station and supply system in a cost-effective way to meet the present and future needs as well as the requirements of the gas safety regulation and the codes of practice; take the initiative to accomplish the design task independently, to coordinate with other contractors and relevant government departments, and to brief the engineering personnel or people concerned on the engineering details.	
4. Level	5	
5. Credits	11	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing LPG filling station and supply system</p> <ul style="list-style-type: none"> ◆ Follow the manufacturer’s and technical instructions to install equipment to meet the explosion-proof specifications ◆ Understand the filling station system flow ◆ Understand the pneumatic control principles ◆ Estimate the construction flow of the filling station ◆ Understand the internal structure of the dispenser <p>6.2 Methods and procedures of designing LPG filling station and supply system</p> <ul style="list-style-type: none"> ◆ Design LPG pipes with suitable diameter ◆ Design the LPG piping path ◆ Design the pneumatic control piping path ◆ Design the number of emergency shut-down buttons ◆ Design the location of emergency shut-down buttons ◆ Design the number of dispensers ◆ Design the locations of dispensers ◆ Design the locations of LPG tanks ◆ Design the number of LPG pumps 	

	<ul style="list-style-type: none"> ◆ Design the locations of LPG off-loading system ◆ Design the locations of ventilating pipes for the LPG tank ◆ Design the pneumatic control system <p>6.3 Professional knowledge and responsibilities for designing LPG filling station and supply system</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] ◆ Apply all the provisions in the Code of Practice for Hong Kong LPG Industry: Module 2 [Underground LPG Pipework] ◆ Apply other gas related regulations and codes of practice ◆ Apply other fire related legislations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <p>(i) Capable to choose suitable locations, models, specifications and number of equipment to be installed in the LPG filling station to be built; and</p> <p>(ii) Capable to design LPG piping system, pneumatic control system and emergency shut-down system for the LPG filling station to be built.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 and EMGAIT201A 【Install and test gas supply system and ancillary systems in LPG filling station】 .</p>

1. Title	Design high pressure gas piping network and relevant pressure regulation control equipment
2. Code	EMGADE505A
3. Range	Design high pressure gas piping network and relevant pressure regulation control equipment in a cost-effective way for gas piping network in roads according to present needs and future development as well as the requirements of the gas safety regulation and codes of practice; take the initiative to accomplish the design task independently, coordinate with other public utilities and relevant government departments, and brief the engineering personnel or people concerned on the engineering details.
4. Level	5
5. Credits	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing high pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Understand different properties and range of application of the following pipes: <ul style="list-style-type: none"> • Polyethylene (PE) pipe • Seamless steel pipe (Schedule 80) • Ductile iron pipe ◆ Understand the operation and limitations on the use of electro fusion method to connect PE pipes ◆ Understand the operation and limitations on the use of automatic butt fusion method to connect PE pipes ◆ Understand the purpose and limitations on the use of cathode protection ◆ Point out the protection requirements correctly on underground pipes, including anti-corrosion, road surface pressure and mechanical damage, etc. ◆ List the advantages and disadvantages of different pressure regulation control equipment ◆ Understand underground public utilities plans

	<p>6.2 Methods and procedures of designing high pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Design a high pressure gas piping network with suitable pipe diameter and path ◆ Determine to use branches or loops for the piping network with reference to the conditions and actual situation ◆ Select pressure regulation control equipment with reference to conditions like the position for installation, amount of gas consumed, operating pressure and accuracy required ◆ Read out and explain the working drawing of the gas network clearly and put on record the work completed <p>6.3 Professional knowledge and responsibilities for designing high pressure gas piping network and relevant pressure regulation control equipment</p> <ul style="list-style-type: none"> ◆ Apply basic legislations and regulations relevant to underground public utilities installation
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design high pressure gas piping network and relevant pressure regulation control equipment for general gas piping network in roads.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】, EMGADE403A【Design low pressure gas piping network and relevant pressure regulation control equipment】 and EMGADE405A 【Design intermediate and medium pressure gas piping network and relevant pressure regulation control equipment】 .</p>

1. Title	Write all kinds of electrical and mechanical engineering reports in Chinese
2. Code	EMCUDE506A
3. Range	For electrical and mechanical engineering design and operation, use correct report format to write all kinds of electrical and mechanical engineering reports in Chinese, including project management progress report, operation management report, engineering progress report, equipment fault report, accident investigation report, etc.
4. Level	5
5. Credit	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Key points of all kinds of electrical and mechanical engineering reports and their presentation</p> <ul style="list-style-type: none"> ◆ Understand the key points and purposes of all kinds of electrical and mechanical engineering reports, including: <ul style="list-style-type: none"> • Equipment fault report • Equipment inspection report • Accident investigation report • Operation management report <ul style="list-style-type: none"> ▸ Financial status of the company ▸ Balance of account ▸ Engineering budget • Engineering project management progress report <ul style="list-style-type: none"> ▸ Progress of crucial procedures ▸ Status of implementation of work plan, delay and causes, monitoring indicators and solutions ◆ Understand formats the above-mentioned electrical and mechanical engineering reports and common technical terms of electrical and mechanical services

	<p>6.2 Write all kinds of electrical and mechanical engineering reports in Chinese</p> <ul style="list-style-type: none"> ◆ Use correct report format to write all kinds of the above-mentioned electrical and mechanical engineering reports in Chinese ◆ Use drawings to strengthen and enrich the contents of the reports, including bar chart, square chart, pie chart, circular chart and flow chart, etc ◆ Write in fluent Chinese
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to write all kinds of electrical and mechanical engineering reports in fluent Chinese with graphs which conform to official document standards.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic Chinese level.</p>

1. Title	Write all kinds of electrical and mechanical engineering reports in English
2. Code	EMCUDE507A
3. Range	For electrical and mechanical engineering design and operation, use correct report format to write all kinds of electrical and mechanical engineering reports in English, including project management progress report, operation management report, engineering progress report, equipment fault report, accident investigation report, etc.
4. Level	5
5. Credit	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Key points of all kinds of electrical and mechanical engineering reports and their presentation</p> <ul style="list-style-type: none"> ◆ Understand the key points and purposes of all kinds of electrical and mechanical engineering reports, including: <ul style="list-style-type: none"> • Equipment fault report • Equipment inspection report • Accident investigation report • Operation management report <ul style="list-style-type: none"> ▸ Financial status of the company ▸ Balance of account ▸ Engineering budget • Engineering project management progress report <ul style="list-style-type: none"> ▸ Progress of crucial procedures ▸ Status of implementation of work plan, delay and causes, monitoring indicators and solutions ◆ Understand formats the above-mentioned electrical and mechanical engineering reports and common technical terms of electrical and mechanical services

	<p>6.2 Write all kinds of electrical and mechanical engineering reports in English</p> <ul style="list-style-type: none"> ◆ Use correct report format to write all kinds of the above-mentioned electrical and mechanical engineering reports in English ◆ Use drawings to strengthen and enrich the contents of the reports, including bar chart, square chart, pie chart, circular chart and flow chart, etc ◆ Write in fluent English
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to write all kinds of electrical and mechanical engineering reports in fluent English with graphs which conform to official document standards.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses basic English level.</p>

1. Title	Test and commission gasholders	
2. Code	EMGAIT501A	
3. Range	Test and commission general gasholders in Hong Kong.	
4. Level	5	
5. Credits	10	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of testing and commissioning gasholder</p> <ul style="list-style-type: none"> ◆ Understand the operation and safety measures for general gasholders ◆ Understand the design parameters and standards for general gasholders ◆ Understand the requirements on repairing general gasholders ◆ Understand the working drawing <p>6.2 Methods and procedures testing and commissioning gasholder</p> <ul style="list-style-type: none"> ◆ Commission the gasholder correctly ◆ Evaluate the status of the gasholder and its relevant equipment to ensure that the safety requirements are met ◆ Arrange suitable personnel to carry the testing and commissioning procedures according to the site environment, special installation required and relevant safety requirements; and ensure the quality of work through project monitoring <p>6.3 Professional knowledge and responsibilities for testing and commissioning gasholder</p> <ul style="list-style-type: none"> ◆ Apply all the provisions in the Gas Safety (Gasholders Examination) Regulation under the Gas Safety Ordinance, Cap. 51 ◆ Apply other gas related regulations and codes of practice ◆ List the engineering quality requirements clearly 	

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to commission and examine the gasholder, and evaluate the status of the gasholder and its relevant equipment to ensure that the safety requirements are met.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Handle major gas emergencies	
2. Code	EMGAOR501A	
3. Range	Handle major gas emergencies in Hong Kong community such as accidents or disasters happened in underground network and gas compounds, etc.	
4. Level	5	
5. Credits	6	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of handling major gas emergencies</p> <ul style="list-style-type: none"> ◆ Organize and assess the areas of influence, and all public and private facilities within the supply network and the area being affected by the major gas emergency; list the handling priority and requirements accordingly in consideration of various aspects ◆ Understand clearly the authority and responsibilities of the gas supply company ◆ List and choose to use the support and emergency measures offered by relevant departments and organizations according to their characteristics ◆ Handle and respond to press enquiries in a suitable manner <p>6.2 Methods and procedures of handling major gas emergencies</p> <ul style="list-style-type: none"> ◆ Take necessary steps to reduce as much as possible the influence and the number of customers being affected ◆ Coordinate relevant departments and arrange the staff to resume the gas supply as soon as possible ◆ Stop the gas supply correctly ◆ Make suitable arrangements such as evacuating the public and controlling the scene, etc. ◆ Be quick at finding remedial actions ◆ Take necessary steps to reduce the degree of danger as much as possible 	

	<ul style="list-style-type: none"> ◆ Compile incident report for submission to the Electrical and Mechanical Services Department and relevant government departments ◆ Understand the impact of major gas emergencies on the community and the responsibilities entailed; assess the resources needed for repair <p>6.3 Professional knowledge and responsibilities for handling major gas emergencies</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to handle major gas emergencies in Hong Kong community such as accidents or disasters happened in underground network and gas compounds, etc.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Maintain normal operation of gas supply network
2. Code	EMGAOR502A
3. Range	Maintain normal operation of the gas supply network.
4. Level	5
5. Credits	9
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of maintaining normal operation of gas supply network</p> <ul style="list-style-type: none"> ◆ Organize and assess the gas consumption of the supply network ◆ Understand clearly the authority and responsibilities of the gas supply company ◆ List and choose to use the support and emergency measures offered by relevant departments and organizations according to their characteristics <p>6.2 Methods and procedures of maintaining normal operation of gas supply network</p> <ul style="list-style-type: none"> ◆ Improve the Towngas network drawing management system in order to enhance the procedures of monitoring excavation works, facilitate electronic data exchange with other public utilities in future, etc. ◆ Use the monitoring and data collection system for data telemetry across Hong Kong ◆ Use the monitoring and data collection system to maintain normal gas supply ◆ Plan to use new technology to replace old underground gas mains continuously so as to reduce the chance of damage caused by disrepair or accident ◆ Arrange routine inspection and maintenance for the gas supply network

	<p>6.3 Professional knowledge and responsibilities for maintaining normal operation of gas supply network</p> <p>◆ Understand the importance of and responsibilities for maintaining normal operation of the gas supply network</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to maintain normal operation of the gas supply network.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .</p>

1. Title	Crisis management for gas supply
2. Code	EMGAOM501A
3. Range	Perform crisis management for the gas supply.
4. Level	5
5. Credits	5
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of crisis management for gas supply</p> <ul style="list-style-type: none"> ◆ Understand the gas supply system ◆ Understand potential risks in gas supply ◆ Master the industrial safety knowledge <p>6.2 Methods and procedures of crisis management for gas supply</p> <ul style="list-style-type: none"> ◆ Formulate crisis management mechanism for the gas supply ◆ Formulate internal coordination system measures ◆ Assess property losses that may be caused by the gas supply ◆ Assess the corporate responsibilities that may be caused by the gas supply ◆ Assess the influence of gas supply on environment ◆ Assess the economic influence of gas supply <p>6.3 Professional knowledge and responsibilities for crisis management for gas supply</p> <ul style="list-style-type: none"> ◆ Apply all relevant provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform crisis management for the gas supply.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Risk assessment for gas work
2. Code	EMGASH501A
3. Range	Perform risk assessment for gas work.
4. Level	5
5. Credits	5
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of risk assessment for gas work</p> <ul style="list-style-type: none"> ◆ Understand gas supply system ◆ Understand potential risks in gas supply work ◆ Master the industrial safety knowledge <p>6.2 Methods and procedures of risk assessment for gas work</p> <ul style="list-style-type: none"> ◆ Identify the possible risks caused by the hazards of various kinds of gas work ◆ Class the risks of various kinds of gas work by their level of seriousness ◆ Categorize various kinds of gas work in the gas industry ◆ Identify the hazards of various kinds of gas work (including the materials, procedures or equipment) ◆ Formulate risk control plans to minimize the risks to an acceptable level ◆ Compile risk assessment reports correctly <p>6.3 Professional knowledge and responsibilities for risk assessment for gas work</p> <ul style="list-style-type: none"> ◆ Apply all relevant provisions in the Gas Safety (Gas Supply) Regulations under the Gas Safety Ordinance, Cap. 51 ◆ Apply relevant gas safety regulations and codes of practice
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to perform risk assessment for gas work.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 .

1. Title	Formulate occupational safety and health and environmental protection schemes
2. Code	EMCUSH505A
3. Range	Analyze areas that have to be enhanced regarding staff's awareness of occupational safety and health and environmental protection, and to formulate schemes to enhance staff's awareness of occupational safety and health and environmental protection.
4. Level	5
5. Credit	6
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Occupational safety and health and environmental protection scheme</p> <ul style="list-style-type: none"> ◆ Understand the importance of occupational safety and health and environmental protection to staff; and draft a scheme relevant to occupational safety and health and environmental protection including the following: <ul style="list-style-type: none"> • Scheme targets • schedule • Effectiveness review • Manpower arrangement • Budget, etc. <p>6.2 Formulation of occupational safety and health and environmental protection scheme</p> <ul style="list-style-type: none"> ◆ Identify the difference between the company's targets and staff awareness of occupational safety and health and environmental protection <ul style="list-style-type: none"> • Collect opinions of staff on occupational safety and health and environmental protection management • Set the company's targets on occupational safety and health and environmental protection management

	<ul style="list-style-type: none">• Identify the difference between the company's targets and staff awareness of occupational safety and health and environmental protection management◆ Formulate plans to enhance staff's awareness of occupational safety and health and environmental protection management<ul style="list-style-type: none">• Analyze company's occupational safety and health and environmental protection management culture, and draft proposals for the enhancement scheme such as training courses, seminars and quiz competitions, etc.• Collect staff's opinions on safety, health and environmental improvement• Collect staff's opinions on the enhancement scheme• Use other organizations' successful experience in organizing activities to enhance staff's awareness of occupational safety and health and environmental protection• Formulate a scheme to enhance staff's awareness of occupational safety, health and environmental protection, including the formulation of scheme targets, implementation methods and schedule, expected performance, budget, measuring methods, etc.• Manpower arrangement for the implementation of the scheme
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	<ul style="list-style-type: none"> ◆ Review the effectiveness of the scheme <ul style="list-style-type: none"> • Ensure good communication during the implementation of the scheme • Measure and review the effectiveness of the scheme after implementation
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to formulate and implement schemes to enhance staff's awareness of occupational safety and health and environmental protection; and to review their effectiveness.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses knowledge of occupational safety management.</p>

1. Title	Formulate environmental protection management system
2. Code	EMCUSH507A
3. Range	Master the legal requirements on environmental protection so as to formulate a basic environmental protection management system.
4. Level	5
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Basic knowledge of environmental protection</p> <ul style="list-style-type: none"> ◆ Understand the legal requirements on environmental protection, including the areas of emissions, waste water, noise, solid waste, chemical waste, etc. ◆ Understand the operation of a basic environmental protection management system, including: <ul style="list-style-type: none"> • Goals of the management system • Monitoring mechanism • Contingency measures • Review measures • ISO 14001, etc. <p>6.2 Formulation of basic environmental protection management system</p> <ul style="list-style-type: none"> ◆ Formulate a basic environmental protection management system according to the legal requirements on environmental protection, including the following: <ul style="list-style-type: none"> • Goals of the management system • Management system mechanism • Monitoring mechanism • Contingency measures • Review measures

7. Assessment Criteria	The integrated outcome requirement of this unit of competency is: (i) Capable to formulate an effective basic environmental protection management system for the electrical and mechanical services according to the legal requirements on environmental protection, and review its effectiveness.
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic knowledge of environmental protection.

1. Title	Formulate and analyze quality assurance reports
2. Code	EMCUQM504A
3. Range	With regard to quality management of electrical and mechanical services, analyze information generated from quality monitoring points of each engineering procedure, quality issues and problems, and formulate quality assurance reports.
4. Level	5
5. Credit	3
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Format and key points of quality assurance report on electrical and mechanical services</p> <p style="padding-left: 100px;">◆ Understand the format and key points of quality assurance report on electrical and mechanical services</p> <p>6.2 Formulate and analyze quality assurance reports</p> <p style="padding-left: 100px;">◆ Base on records of the major monitoring points of each service procedure and all quality related issues, such as quality level for each action, non-compliance with regulations, errors, defects, deviation, excesses or shortfalls and other causes, etc., to quantify quality management issues and problems so as to provide sufficient data or information to produce the quality assurance reports</p> <p style="padding-left: 120px;">• Analyze all quality management issues and problems, formulate quality assurance reports and report to the management</p>
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to effectively monitor each service procedure, quantify quality management issues and problems, analyze data and information, and formulate quality assurance reports.</p>
8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses basic concepts of quality management.

1. Title	Examine and assess LPG cylinders / tanks / vaporizers / gas mains	
2. Code	EMGAGS501A	
3. Range	Test and examine LPG cylinders/tanks/vaporizers/gas mains in the LPG central gas supply system and LPG compounds to assess whether they are suitable for further use.	
4. Level	5	
5. Credits	7	
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of examining and assessing LPG cylinders / tanks / vaporizers / gas mains</p> <ul style="list-style-type: none"> ◆ Point out the design pressure of LPG cylinders / tanks / vaporizers / gas mains ◆ Point out the rated test pressure of LPG cylinders / tanks / vaporizers / gas mains LPG ◆ Compare the effects of the compression ratio of air with that of water on the examination ◆ Compare the effects of the thermal expansion rate of air with that of water on the examination ◆ Compare the advantages and disadvantages of using air and water as media of examination <p>6.2 Methods and procedures of examining and assessing LPG cylinders / tanks / vaporizers / gas mains</p> <ul style="list-style-type: none"> ◆ Perform coat cracking test and confirm the test result if it meets the requirements ◆ Perform magnetic particle test and confirm the test result if it meets the requirements ◆ Monitor the hydraulic test and confirm the test result if it meets the requirements ◆ Perform ultrasonic test on wall thickness and confirm the test result if it meets the requirements ◆ Perform ultrasonic test on paint thickness and confirm the test result if it meets the requirements ◆ Perform inner surface examination for manholes and confirm the examination result if it meets the requirements 	

	<p>6.3 Professional knowledge and responsibilities for examining and assessing LPG cylinders / tanks / vaporizers / gas mains</p>	<ul style="list-style-type: none"> ◆ Perform inner / outer surface corrosion and damage examination on LPG tanks and confirm the examination result if it meets the requirements ◆ Monitor the LPG tank support and weld joint examination and confirm the test result if it meets the requirements ◆ Use the technical information on engineering materials provided by the LPG cylinder / tank / vaporizer / gas main manufacturer for assessment ◆ Illustrate or list the major materials for making LPG cylinders / tanks / vaporizers / gas mains and their properties ◆ Apply design parameters and testing standards for LPG tanks and relevant standards ◆ Apply the NFPA58, 【Standard for the storage and handling of liquefied petroleum gases】 ◆ Apply the British Standard and relevant standards of other countries ◆ Apply the standards in the Code of Practice for Hong Kong LPG Industry: Module 1 [LPG Compounds and Cylinder Stores] in performing examination and assessment ◆ Apply the standards in the Code of Practice for Hong Kong LPG Industry: Module 2 [Underground LPG Pipework] in performing examination and assessment ◆ Apply the 【Guideline for Revalidation of LPG Fuel Tanks for LPG Vehicles】 issued by the Electrical and Mechanical Services Department ◆ Apply other relevant standards, codes of practice and legislations in performing examination and assessment
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	<ul style="list-style-type: none"> ◆ Apply and follow the Gas Safety (Gas Supply) Regulations in performing examination and assessment ◆ Understand the registration arrangements and terms of reference for authorized persons
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to test and examine LPG cylinders/tanks/vaporizers/gas mains in the LPG central gas supply system and LPG compounds to assess whether they are suitable for further use.</p>
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【 Basic knowledge of gas application 】 .</p>

Competency Level 6

1. Title	Design and plan gas supply network system to meet social development
2. Code	EMGADE601A
3. Range	Design high pressure gas piping network and relevant pressure regulation control equipment in a cost-effective way for gas piping network in roads according to present needs and future development as well as the requirements of the gas safety regulation and codes of practice; manage, supervise and direct the working team to accomplish the design work, coordinate with other public utilities and relevant government departments, and brief the engineering personnel or people concerned on the engineering details.
4. Level	6
5. Credits	10
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge and principles of designing and planning gas supply network system to meet social development</p> <ul style="list-style-type: none"> ◆ Understand the public utilities network <p>6.2 Methods and procedures of designing and planning gas supply network system to meet social development</p> <ul style="list-style-type: none"> ◆ Design a safe and reliable gas supply network ◆ Assess the development of technologies now using and to be used in future ◆ Leave space for network upgrade ◆ Analyze information on planning ◆ Calculate accurately the flow of the piping network
7. Assessment Criteria	<p>The integrated outcome requirement of this unit of competency is:</p> <p>(i) Capable to design and plan gas supply network system for general gas piping network in roads to meet social development.</p>

8. Remarks	The credit value of this unit of competency is set on the presumption that the person already possesses the competency of EMGADE101A 【Basic knowledge of gas application】 , EMGADE403A 【Design low pressure gas piping network and relevant pressure regulation control equipment】 , EMGADE503A 【Design intermediate and medium pressure gas piping network and relevant pressure regulation control equipment】 and EMGADE505A 【Design high pressure gas piping network and relevant pressure regulation control equipment】 .
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Competency Level 7

1. Title	Formulate overall operation development direction and strategy
2. Code	EMCUOM701A
3. Range	With regard to electrical and mechanical engineering operation management, understand the social conditions, fully master the development trend of the industry as well as the goals and present situation of the organization so as to formulate an overall operation development direction and strategy for the organization; handle very complex / new issues in the absence of complete/consistent data/information, and develop creative response.
4. Level	7
5. Credit	20
6. Competency	<p style="text-align: center;"><u>Performance Requirements</u></p> <p>6.1 Knowledge of social, electrical and mechanical industry's environment</p> <ul style="list-style-type: none"> ◆ Understand the development trends of society and the electrical and mechanical trade ◆ Understand clearly the influence of legislations, especially ordinances related to safety, health and environmental protection, on the industry ◆ Master social and economic information <p>6.2 Formulate overall operation development direction and strategy</p> <ul style="list-style-type: none"> ◆ Analyze strengths of the organization <ul style="list-style-type: none"> • Use analytical tools to analyze strengths of the organization in operation management, occupational safety and health and environmental protection, quality management, human resources management, financial management, product development management and risk management • Use internal questionnaire survey for analysis and reference • Use the comparison with industrial benchmarking for analysis and reference ◆ Formulate development goals for the organization according to the analysis of the its strengths, the social and industrial environment and trend, and stakeholders' needs

	<ul style="list-style-type: none"> ◆ Use operation management techniques to formulate an overall operation development direction and strategy according to development goals, including: <ul style="list-style-type: none"> • Business development strategy • Business operation strategy • Human resources management strategy • Financial strategy • Product development strategy • Risk management strategy • Communication channels ◆ Formulate mechanisms to measure, review and improve the operation development direction and strategy ◆ Lead the organization for a forward-looking development according to the following social and industrial changes <ul style="list-style-type: none"> • Product or service requirements • Technological development • Human resources and all kinds of costs in comparison with competitors or the region
7. Assessment Criteria	<p>The integrated outcome requirements of this unit of competency are:</p> <ul style="list-style-type: none"> (i) Capable to formulate an overall operation development direction and strategy according to the situation of an electrical and mechanical organization; (ii) Capable to formulate for the organization mechanisms to measure, review and improve the operation development direction and strategy; and (iii) Capable to lead the organization for a forward-looking development according to social and industrial changes.
8. Remarks	<p>The credit value of this unit of competency is set on the presumption that the person already possesses knowledge of engineering operation management.</p>

Appendix I

Generic Level Descriptors

Generic Level Descriptors

Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
1	<ul style="list-style-type: none"> - Employ recall and demonstrate elementary comprehension in a narrow range of areas with dependency on ideas of others - Exercise basic skills - Receive and pass on information - Use, under supervision or prompting, basic tools and materials. - Apply learnt responses to solve problems - Operate in familiar, personal and/or everyday contexts - Take some account, with prompting, of identified consequences of actions. 	<ul style="list-style-type: none"> - Operate mainly in closely defined and highly structured contexts - Carry out processes that are repetitive and predictable - Undertake the performance of clearly defined tasks - Assume a strictly limited range of roles. 	<ul style="list-style-type: none"> - The ability to perform tasks of routine and repetitive nature given clear direction - Carry out directed activity under close supervision - Rely entirely on external monitoring of output and quality 	<ul style="list-style-type: none"> - Use very simple skills with assistance — for example: - Take some part in discussions about straightforward subjects - Read and identify the main points and ideas from documents about straightforward subjects - Produce and respond to a limited range of simple, written and oral communications, in familiar/routine contexts - Carry out a limited range of simple tasks to process data and access information - Use a limited range of very simple and familiar numerical and pictorial data - Carry out calculations, using whole numbers and simple decimals to given levels of accuracy.

Generic Level Descriptors

Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
2	<ul style="list-style-type: none"> - Apply knowledge based on an underpinning comprehension in a selected number of areas - Make comparisons with some valuation and interpret available information - Apply basic tools and materials and use rehearsed stages for solving problems. - Operate in familiar, personal and/or everyday contexts - Take account the identified consequences of actions. 	<ul style="list-style-type: none"> - Choose from a range of procedures performed in a number of contexts, a few of which may be non-routine - Co-ordinate with others to achieve common goals. 	<ul style="list-style-type: none"> - The ability to perform a range of tasks in predictable and structured contexts - Undertake directed activity with a degree of autonomy - Achieve outcomes within time constraints - Accept defined responsibility for quantity and quality of output subject to external quality checking. 	<ul style="list-style-type: none"> - Use skills with some assistance —for example: - Take active part in discussions about identified subjects - Identify the main points and ideas from documents and reproduce them in other contexts - Produce and respond to a specified range of written and oral communications, in familiar/routine contexts - Carry out a defined range of tasks to process data and access information - Use a limited range of familiar numerical and graphical data in everyday contexts - Carry out calculations, using percentages and graphical data to given levels of accuracy.

Generic Level Descriptors

Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
3	<ul style="list-style-type: none"> - Apply knowledge and skills in a range of activities, demonstrating comprehension of relevant theories - Access, organize and evaluate information independently and make reasoned judgements in relation to a subject or discipline - Employ a range of responses to well defined, but sometimes unfamiliar or unpredictable, problems - Make generalizations and predictions in familiar contexts. 	<ul style="list-style-type: none"> - Operate in a variety of familiar and some unfamiliar contexts, using a known range of technical or learning skills - Select from a considerable choice of predetermined procedures - Give presentations to an audience 	<ul style="list-style-type: none"> - The ability to perform tasks in a broad range of predictable and structured contexts which may also involve some non-routine activities requiring a degree of individual responsibility - Engage in self-directed activity with guidance/evaluation - Accept responsibility for quantity and quality of output - Accept well defined but limited responsibility for the quantity and quality of the output of others 	<ul style="list-style-type: none"> - Use a wide range of largely routine and well practiced skills — for example: - Produce and respond to detailed and complex written and oral communication in familiar contexts, and use a suitable structure and style when writing extended documents. - Select and use standard applications to obtain, process and combine information - Use a wide range of numerical and graphical data in routine contexts, which may have some non-routine elements.

Generic Level Descriptors

Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
4	<ul style="list-style-type: none"> - Develop a rigorous approach to the acquisition of a broad knowledge base, with some specialist knowledge in selected areas - Present and evaluate information, using it to plan and develop investigative strategies - Deal with well defined issues within largely familiar contexts, but extend this to some unfamiliar problems - Employ a range of specialised skills and approaches to generate a range of responses. 	<ul style="list-style-type: none"> - Operate in a range of varied and specific contexts involving some creative and non-routine activities - Exercise appropriate judgement in planning, selecting or presenting information, methods or resources - Carry out routine lines of enquiry, development of investigation into professional level issues and problems. 	<ul style="list-style-type: none"> - The ability to perform skilled tasks requiring some discretion and judgement, and undertake a supervisory role - Undertake self-directed and a some directive activity - Operate within broad general guidelines or functions - Take responsibility for the nature and quantity of own outputs - Meet specified quality standards - Accept some responsibility for the quantity and quality of the output of others. 	<ul style="list-style-type: none"> - Use a wide range of routine skills and some advanced skills associated with the subject/discipline — for example: - Present using a range of techniques to engage the audience in both familiar and some new contexts - Read and synthesize extended information from subject documents; organize information coherently, convey complex ideas in well-structured form - Use a range of IT applications to support and enhance work - Plan approaches to obtaining and using information, choose appropriate methods and data to justify results & choices - Carry out multi-stage calculations.

Generic Level Descriptors

Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
5	<ul style="list-style-type: none"> - Generate ideas through the analysis of abstract information and concepts - Command wide ranging, specialized technical, creative and/or conceptual skills - Identify and analyse both routine and abstract professional problems and issues, and formulate evidence-based responses - Analyse, reformat and evaluate a wide range of information - Critically analyse, evaluate and/or synthesize ideas, concepts, information and issues - Draw on a range of sources in making judgments. 	<ul style="list-style-type: none"> - Utilise diagnostic and creative skills in a range of technical, professional or management functions - Exercise appropriate judgement in planning, design, technical and/or supervisory functions related to products, services, operations or processes. 	<ul style="list-style-type: none"> - Perform tasks involving planning, design, and technical skills, and involving some management functions - Accept responsibility and accountability within broad parameters for determining and achieving personal and/or group outcomes - Work under the mentoring of senior qualified practitioners - Deal with ethical issues, seeking guidance of others where appropriate. 	<ul style="list-style-type: none"> - Use a range of routine skills and some advanced and specialized skills in support of established practices in a subject/discipline, for example: - Make formal and informal presentations on standard/mainstream topics in the subject/discipline to a range of audiences - Participate in group discussions about complex subjects; create opportunities for others to contribute - Use a range of IT applications to support and enhance work - Interpret, use and evaluate numerical and graphical data to achieve goals/targets.

Generic Level Descriptors

Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
6	<ul style="list-style-type: none"> - Critically review, consolidate, and extend a systematic, coherent body of knowledge - Utilise highly specialised technical research or scholastic skills across an area of study - Critically evaluate new information, concepts and evidence from a range of sources and develop creative responses - Critically review, consolidate and extend knowledge, skills practices and thinking in a subject/discipline - Deal with complex issues and make informed judgements in the absence of complete or consistent data/information. 	<ul style="list-style-type: none"> - Transfer and apply diagnostic and creative skills in a range of situations - Exercise appropriate judgement in complex planning, design, technical and/or management functions related to products, services operations or processes, including resourcing and evaluation - Conduct research, and/or advanced technical or professional activity - Design and apply appropriate research methodologies. 	<ul style="list-style-type: none"> - Apply knowledge and skills in a broad range of professional work activities - Practice significant autonomy in determining and achieving personal and/or group outcomes - Accept accountability in related decision making including use of supervision - Demonstrate leadership and /or make an identifiable contribution to change and development. 	<ul style="list-style-type: none"> - Communicate, using appropriate methods, to a range of audiences including peers, senior colleagues, specialists - Use a wide range of software to support and enhance work; identify refinements to existing software to increase effectiveness or specify new software - Undertake critical evaluations of a wide range of numerical and graphical data, and use calculations at various stages of the work.

Generic Level Descriptors

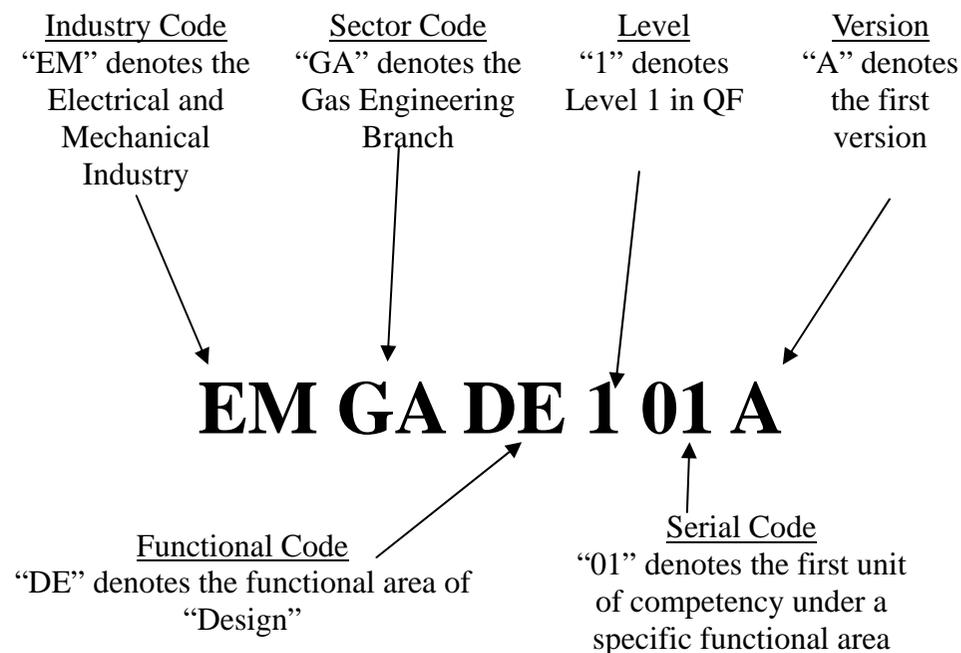
Level	Knowledge & Intellectual Skills	Processes	Application, Autonomy & Accountability	Communications, IT & Numeracy
7	<ul style="list-style-type: none"> - Demonstrate and work with a critical overview of a subject or discipline, including an evaluative understanding of principal theories and concepts, and of its broad relationships with other disciplines - Identify, conceptualise and offer original and creative insights into new, complex and abstract ideas and information - Deal with very complex and/or new issues and make informed judgements in the absence of complete or consistent data/information - Make a significant and original contribution to a specialised field of inquiry, or to broader interdisciplinary relationships. 	<ul style="list-style-type: none"> - Demonstrate command of research and methodological issues and engage in critical dialogue - Develop creative and original responses to problems and issues in the context of new circumstances. 	<ul style="list-style-type: none"> - Apply knowledge and skills in a broad range of complex and professional work activities, including new and unforeseen circumstances - Demonstrate leadership and originality in tackling and solving problems - Accept accountability in related decision making - High degree of autonomy, with full responsibility for own work, and significant responsibility for others - Deal with complex ethical and professional issues. 	<ul style="list-style-type: none"> - Strategically use communication skills, adapting context and purpose to a range of audiences - Communicate at the standard of published academic work and/or critical dialogue - Monitor, review and reflect on own work and skill development, and change and adapt in the light of new demands - Use a range of software and specify software requirements to enhance work, anticipating future requirements - Critically evaluate numerical and graphical data, and employ such data extensively.

Appendix II

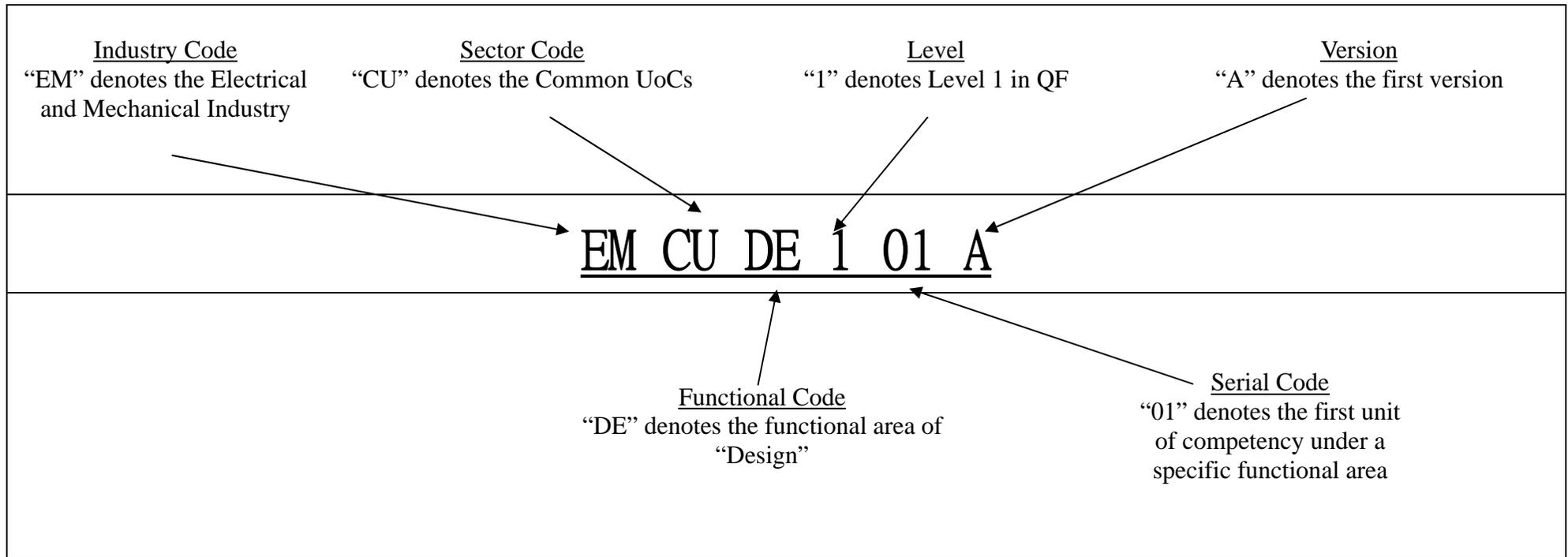
Coding Criteria

Coding Criteria

	Major Functional areas	Codes
(i)	Design	DE
(ii)	Installation and Commissioning	IT
(iii)	Operation, Repair and Maintenance	OR
(iv)	Project Management	PM
(v)	Operation Management	OM
(vi)	Safety, Health and Environment	SH
(vii)	Quality Management	QM
(viii)	Marketing and Sales	MS
(ix)	Gas Supply	GS



Common UoCs Coding Criteria (The Common UoCs are applicable to other branches)



- Remarks: 1) There is not space in the code.
2) The code must be underlined.