



Australian Government

Department of Education, Employment and Workplace Relations

UEGNSG121B Prepare safe design specifications of a gas system

Release: 1

UEGNSG121B Prepare safe design specifications of a gas system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This Unit covers the requirements to identify safe systems design specifications based on the required Performance Criteria for a gas system/installation, covering natural or liquefied petroleum gas. The competency standard refers to Gas systems; Environmental hazards; System logistics; Resources; Relevant Documentation; Legislative compliance; Relevant authorities.

Application of the Unit

Application of the Unit 2)

This competency standard shall apply to any basic and safe work site where Gas Industry operations occur. It could also apply, where applicable to other workplaces in the electricity supply industry (transmission and distribution and generation), the electrotechnology industry and the water industry, subject to all Occupational Health and Safety and duty of care requirements being met for the workplace.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit are not subject to licence regulation other than those directly related to Occupational Health and Safety, gas/electricity/water industry safety and compliance,

License to practice**3)**

industrial relations, environmental protection, telecommunications, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limit the age at which a person can operate certain equipment.

Pre-Requisites**Prerequisite Unit(s)****4)****Competencies****4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

Nil

Literacy and numeracy skills**4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 5 Writing 5 Numeracy 5

Employability Skills Information**Employability Skills****5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

- 6)** Elements describe the essential outcomes of a competency standard unit
 Performance Criteria describe the required performance needed to demonstrate achievement of the element.
 Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare input and output Performance Criteria for the system	1.1 OHS principles and practices and Environmental and Sustainable Energy procedures which may influence the systems are reviewed and determined
	1.2 Proposed system usage is analysed and technical requirements of the system are investigated and expected outcomes of the work are confirmed with the appropriate persons
	1.3 Organisational established procedures on policies and specifications for the job are obtained or established with the appropriate persons
	1.4 Testing parameters are established from organisational established procedures on policies and specifications
	1.5 Testing procedures are discussed with appropriate persons in order to ascertain the project brief
	1.6 Equipment, tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures
	1.7 Work roles and tasks are allocated according to requirements and individual's competencies
	1.8 Work is prioritised and sequenced for the most effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures

ELEMENT	PERFORMANCE CRITERIA
2 Assess the impact of the system on the external environment	1.9 Liaison and communication issues with authorised persons, authorities, clients and land owners are resolved and activities coordinated to carry out work
	1.10 Risk control measures are identified, prioritised and evaluated against the work schedule
	1.11 Relevant work permits are secured to coordinate the performance of work according to requirements and established procedures
	2.1 System logistics are determined and impact on interconnected systems is assessed
	2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and established procedures
	2.3 Decisions are made on the basis of safety and effective outcomes according to requirements and established procedures
	2.4 Mathematical models are used to analyse the effectiveness of the finished product as per requirements and established procedures
	2.5 Technical advice is given to hazards, assessed risks and control measures so that monitoring can be undertaken and appropriate authorities consulted, where necessary, in accordance with requirements and established procedures
	2.6 Essential Knowledge and Associated Skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements
	2.7 Testing is undertaken according to requirements and established procedures
	2.8 Work teams are arranged to ensure planned goals are met according to established

ELEMENT	PERFORMANCE CRITERIA
	procedures
	2.9 Solutions to non-routine problems are identified and actioned, using acquired Essential Knowledge and Associated Skills, according to requirements
	2.10 Quality of work is monitored against personal performance agreement and established organisational and professional standards
	2.11 Strategic plans are developed incorporating organisational initiatives as per established procedures
3 Identify options for the system and evaluate options and prepare specifications	3.1 Final inspections are undertaken to ensure they comply with all requirements and include all specifications and documentation needed to complete the project
	3.2 Design and construction resources are identified and availability and price is determined and maintenance requirements are documented
	3.3 Cost benefit analysis is prepared and evaluation criteria are determined, any shortfalls in recommended option are justified and all compliance requirements are met
	3.4 Appropriate persons are notified of completion and reports and completion documents are finalised.
	3.5 Reports and completion documents are submitted to relevant persons for approval and where applicable, statutory or regulatory approval
	3.6 Approved copies of documents are issued and records are updated in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices for preparing design specifications of a gas system.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-G121 Gas system design specifications B

G 4.1.5 Interpret Gas Industry drawings

Evidence shall show an ability to interpret and understand Gas Industry technical drawings, indicated by the following:

- understanding and interpreting relevant technical drawings including, but not limited to:
 - Process and Instrumentation Diagrams (PID)
 - Facility and pipeline construction and as-built drawings
 - Geographical Information System (GIS) drawings and data
 - Electrical drawings
 - Survey maps
 - Pipeline route maps and alignment sheets

G 5.1.1 Supervise Gas Industry operations

Evidence shall show an understanding of the requirements to undertake the supervision of Gas Industry operations, indicated by the following:

- Implementation of risk management and Occupational Health and Safety (OHS) practices and principles including, but not limited to:
 - risk assessment, risk control and risk control measures
 - hierarchy of control
 - personal protective equipment — strengths and weaknesses
 - identifying hazards and their consequences
 - identifying hazards, assessing associated risks and

implementing appropriate control measures

- developing hazard checklists
- reporting hazards including hazardous events
- planning theory and study of HAZOPS and HAZANS
- knowledge of applicable legislative requirements and Australian/New Zealand and ISO standards and codes of practice for the Gas Industry
- Implementation of relevant organisational policies and procedures
- identification and implementation of control measures
- establishing emergency management techniques
- principles and guidelines including critical incident analysis.

G 5.1.3 Plan for, respond to and manage emergencies

Evidence shall show an understanding and application of emergency management techniques in a Gas Industry environment, indicated by the following:

- emergency management concepts and principles:
 - auditing and planning
 - systems analysis
 - policies and procedures for non-employees and contractors
 - types of emergencies
 - dealing with an emergency
 - elements of an emergency plan
 - employee assistance programs.
- Develop an emergency management plan which includes:
 - First Aid and welfare
 - recovery and post recovery plans
 - legislative requirements
 - interaction with authorities/emergency services
 - communication with key stakeholders
 - initial response/assessment and make safe

G 6.1.1 Understand and utilise concepts and skills for Gas Industry supervisors

Evidence shall show an understanding and interpretation of the concepts and skills required of Gas Industry supervisors to undertake activities, indicated by the following:

- applicable mathematical techniques and principles to enable production of relevant supervisory level calculations, data processing requirements and reports

- engineering principles and operating principles of pipeline systems
- understanding of safe design principles
- appropriate environmental requirements
- correctly read, analyse, interpret and record data
- third-party service location methods
- construction principles and safety
- applicable gas chemistry, properties and characteristics.

G 6.1.2 Understand and utilise information for Gas Industry supervisors

Evidence shall show an understanding of the requirements to undertake supervision/management in a Gas Industry environment, indicated by the following:

- principles of gas flow and gas metering
- organisational standard operating procedures
- site specific safety legislation and safety requirements
 - overview of Occupational Health and Safety including systematic approaches to OHS
 - health and safety stakeholders (union, employers, workers, contractors and managers) hazards
 - risk assessment and control relating to areas such as:
 - electrical safety
 - vibration
 - outdoor work
 - stress
 - equipment, tools and plant
 - noise
 - chemicals and substances
 - manual handling
 - confined spaces
- Stakeholder Relations
 - managing contractors, industry awards, and employee entitlements
 - understanding government and business relations
 - employee associations
 - industry associations
 - awards and agreements
 - collective bargaining and individual agreements
 - conciliation, arbitration, mediation and negotiation
 - coordinate the work of others

- adhere to OHS legislation and regulations
 - understanding government and the development of statute and common law
 - principles of Occupational Health and Safety and risk management
 - Occupational Health and Safety legislation and regulations
- observe environmental and legislative requirements
 - understanding government and the development of statute and common law
 - principles of Occupational Health and Safety
 - environmental and other legislative requirements
- apply applicable permit to work system including types of permit limitations
 - understanding the permit to work system
 - identifying the limitations in a permit to work system
- develop and review standard operating procedures
- review and report on completed work
- employ correct waste management procedures
 - appropriate waste management procedures
 - organisational requirements for waste management
 - consequences of not managing waste effectively
- knowledge of native title issues and legislation
- analyse relevant workplace data eg incident and environmental monitoring to evaluate the effectiveness of the OHS management system.

G 6.1.4 Communicate effectively

Evidence shall show an understanding and utilisation of technology for communication in a Gas Industry environment, indicated by the following:

- effective communication for Gas Industry managers and supervisors
 - motives for communication
 - communication networks: who communicates with whom
 - verbal and non-verbal communication
 - choosing the medium and the flow of a message
 - blocks to effective communication
- analyse and interpret recorded data, review and report
- use information technology for communication
 - understanding how to use information technology

- effective use of email, internet and other communication mediums.

G 6.1.6 Plan and carry out project management

Evidence shall show an understanding and application of the requirements to undertake project management in a Gas Industry environment, indicated by the following:

- project management and costing
 - project planning processes
 - determining project costing
 - planning for events and milestones
 - determining inputs
 - producing outputs to a plan
- planning theory and its processes
 - the importance of planning
 - the planning process
 - organisational goals and objectives
 - strategic planning
 - operational planning
 - forecasting
- prioritise techniques
 - organising/prioritise work flows
 - time management
 - stress management
- managing persons and resources including consultants
 - understanding people
 - understanding behaviour
 - perceiving the causes of behaviour
 - defining leadership
- manage meetings
 - understanding organisational communication
 - formal and informal organisational communication
 - managing meetings and recording minutes
 - drafting minutes
- prepare reports
 - planning the writing process
 - developing the scope and outline of a document/report
 - drafting documents/reports utilising a plan and outline
 - finalising documents/reports

- facilitate contracts and employment
 - parliament, government and the law
 - statute law
 - common law
 - contracts and contract law
 - employment law
- understanding of sound business principles and performance measures
 - understanding organisational behaviour
 - business fundamentals
 - establishing the principles of performance management
 - establishing performance measures
- understanding of competition policy, budgets and product pricing and tariffs
 - understanding of government business relations in the Gas Industry
 - how tariffs are determined
 - working within legislative guidelines in tariffs and pricing.

G 6.1.7 Understand chemical and physical behaviours of gas

Evidence shall show an understanding of the chemical and physical behaviour of gases, and their effects in a gas system indicated by the following:

- chemical and physical behaviours of natural and liquefied petroleum gas
 - understanding of basic chemistry and physics of gases
 - the chemical makeup and properties of natural gas and LPG
 - dangers of working with natural gas and LPG and how to manage natural gas and LPG
- transportation of LPG and natural gas
 - understanding of issues associated with transporting of natural gas and LPG
- LPG supply logistics
 - correct filling procedures for LPG
 - identifying abnormal cylinder conditions
 - correct storage of LPG.

G 6.1.8 Manage environmental and culturally sensitive issues

Evidence shall show an understanding and implementation of the effective management of environmental and culturally

sensitive issues in a Gas Industry environment, indicated by the following:

- understanding applicable environmental legislative compliance and regulation
 - understanding government and laws
 - penalties
 - acting in compliance with laws
- understanding of cultural and community standards and their sensitivities
 - communities and their interaction with government and business in Australia
 - cultural issues in Australia
 - using ethical behaviour in approaching cultural issues
 - anti discrimination legislation in Australia
 - native title issues in Australia
- understanding the impacts of gas installations and infrastructure on the environment and its impacts to native title
 - government and business environmental obligations
 - Australian environmental legislation and its affect on industry
 - the impact of construction of assets to the Australian environment
 - native title considerations for Gas Industry asset owners
- managing sensitive negotiations and communicating with a wide variety of stakeholders
 - understanding stakeholder politics in Australia
 - negotiation and bargaining
 - conciliation and arbitration
 - understanding of sensitive issues and the implications for negotiation.

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with industry and regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this

Training Package.

**Critical aspects
of evidence
required to
demonstrate
competency in
this unit****9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines — UEG11'. Evidence shall also comprise:

- A representative body of Performance Criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
 - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range
 - Apply sustainable energy principles and practices as specified in the Performance Criteria and range
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment
 - Demonstrate an appropriate level of employability skills
 - Conduct work observing the relevant Anti discrimination legislation, regulations, policies and workplace procedures
- Demonstrate performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/procedures/workplace		
Group	The minimum number of items on which skill	Item List

No	is to be demonstrated	
A	At least first 3, Or, last 3	Gas systems: Natural gas systems Transmission and distribution pipelines Control systems Custody transfer stations Odourising plant Corrosion control Interconnecting system LPG storage greater than 50kL Underground storage Tankers and ships
B	At least 3	Environmental hazards: Hazards associated with LPG Hazards associated with natural gas Geological features Soil types Neighbouring plants Residential areas Separation distances and emission and contamination hazards
C	Any 1	System logistics: Land and sea transport routes and equipment Transmission and distribution pipelines Land ownership and easements
D	Any 2	Resources: Appropriate/relevant

		persons Materials, tools and equipment Personal protective equipment Company standard operating procedures Equipment manuals Training resources
E	At least 2	Relevant persons: Company planners and marketers Department heads Business unit managers Company engineers and consultant engineers Technical specialists Statutory authorities and environmental specialists
F	At least 2	Legislative requirements: Occupational Health and Safety legislation Relevant Government Acts, regulations and codes of practice Local government traffic management
G	At least 2	Relevant authorities: Local and shire councils Local government authorities Emergency transport authorities Rail departments Landowners/Traditional land owners

H	At least 8	Relevant documentation: Contracts Specifications/drawings/plans Manufacturer's specifications Work permits Company standard operation and safety procedures Company management plans and policies Hot work permits Company forms and files OHS legislation and codes of practice Other Government legislation Pipeline licenses Quality assurance Commercial agreements
I	All	Interpreting Gas Industry drawings Understanding of emergency management procedures Understanding of concepts and skills for Gas Industry supervisors Communication for Gas Industry supervisors Understanding of project management techniques Understanding of chemical and physical behaviours of gas Ability to manage environmental and cultural

		sensitive issues
J	At least one occasion	Deal with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this Unit.
- Appropriate environmental regulation and work practices.
- Appropriate organisational requirements.
- Appropriate work environment, equipment and tools.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency in preparing safe design specifications of a gas system.

Assessment of this competency must also be undertaken in either an actual workplace or under a simulated work environment. Assessment must also integrate the employability skills.

Method of assessment

9.4)

This Unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note: Competent performance with inherent safe working

practices is expected in the Industry to which this Unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Associated Skills described in this unit.

**Concurrent
assessment and
relationship with
other units**

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied Units where listed.

UEGNSG117B Plan and implement the data acquisition and metering requirements of a gas system

UEGNSG118B Select and commission equipment to meet pressure and temperature control specifications

UEGNSG119B Manage workplace risk

UEGNSG120B Manage gas system environmental compliance

UEGNSG115B Manage gas system projects

UEGNSG122B Manage a customer service gas business unit

UEGNSG123B Manage financial resources

UEGNSG116B Manage physical resources

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

This Unit shall be demonstrated in relation to preparing design specifications of a gas system.

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section of this volume and form an integral part of the Range Statement of this unit:

Gas systems

Environmental hazards

System logistics

Resources

Relevant documentation (6)

Legislative compliance

Safe design principles

Relevant authorities

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Cross discipline.