



THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Directorate of Industrial Training



**Assessment and Training
Package**

For a

**DOMESTIC BIOGAS
TECHNICIAN**

Qualification Level: 1

Occupational Cluster: Technology and Design

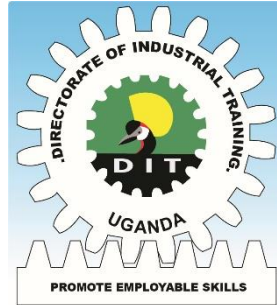
September 2020

Reviewed by :

**Qualifications Standards Department
Directorate of Industrial Training**

Funded by:

Government of Uganda



Assessment and Training Package
For a
DOMESTIC BIOGAS TECHNICIAN

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Under BTVET Act, 2008, the functions of the Directorate of Industrial Training are:

- (a) To identify the needs of the labour market for occupational competencies that fall under the UVQF.
- (b) To regulate apprenticeship schemes.
- (c) To foster and promote entrepreneurial values and skills, as an integral part of the UVQF.
- (d) To secure adequate and sustainable financing for the efficient operations of the Directorate.
- (e) To accredit training institutions or companies as assessment centres.
- (f) To determine fees payable under the Act.
- (g) To develop, apply, expand and improve the purposeful application of Uganda vocational qualifications defined in the UVQF.
- (h) To assess and award Uganda Vocational Qualifications.
- (i) To promote on-the-job training in industry for apprenticeship, traineeship and indenture training and for other training such as further skills training and upgrading.
- (j) To prescribe the procedure for the making of training schemes.

Further to the above provisions, there is an established Uganda Vocational Qualifications Framework (UVQF), under part V of the BTVET Act, 2008. It is stated that:

The purpose of the UVQF is to;

- (a) Define occupational standards in the world of work.
- (b) Define assessment standards.
- (c) Award vocational qualifications of learners who meet the set standards of different studies.
- (d) Provide guidelines for modular training.

The UVQF shall follow principles of Competence Based Education and Training (CBET) which include:

- (a) Flexible training or learning modules.
- (b) Positive assessment and certification.
- (c) Assessment of prior learning.
- (d) Recognition of formal and non-formal training.
- (e) Self-paced or individual learning.
- (f) Work place learning.

For award and recognition of certificates, the BTVET Act, 2008 provides that:

- (1) The Directorate and other examination boards established under the Act shall award certificates and diplomas for Business, Technical or Vocational Education and Training under the UVQF.
- (2) The Certificates and Diplomas to be awarded shall be in the form prescribed by the Minister on the recommendation of the Industrial Training Council.
- (3) The Certificates and Diplomas awarded under the Act shall be recognised in the Uganda education system and by the labour market.

Under the TVET Implementation Standards 2020, the proposed new mandate of the Directorate of Industrial Training shall be restricted to promoting the highest standards in the quality and efficiency of industrial training in the country and ensuring an adequate supply of properly trained manpower at all levels in the industry and the world of work.

The functions shall include:

- (a) Regulating Industrial Training and Trainers.
- (b) Developing Industrial Training Curricula.
- (c) Harmonising Curricula and Certificates of competence.
- (d) Assessing Industrial Training.
- (e) Development of Occupational Standards and Assessment and Training Packages (ATPs) for Trade Testing for the industry and world of work.
- (f) Awarding certificates in that respect.

At operational level in the Directorate, the Qualification Standards Department performs development tasks related to concepts, procedures and instruments for establishment of the UVQF in close collaboration with both public and private stakeholders in vocational training.

In particular, the Department organises and coordinates the development of Assessment and Training Packages for use in competence-based vocational training as well as standards-based assessment and certification.

The Directorate has therefore produced this Assessment and Training Package for use in implementing Competence-Based Education and Training mechanisms.

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Word from Permanent Secretary

The Kajubi Report (1989) and the Uganda Government White Paper on Education Review (1992) emphasised that the Uganda Secondary School Education should be vocationalised.

The World Bank Report on education in Uganda 2007 observed that although Uganda was experiencing steady economic growth on one hand, the secondary education curriculum was inadequately addressing the social and economic needs of the country on the other. The Report further noted that it is not the very top academic cadres that contribute most to the growth of the GDP but rather the competent middle level technicians that are flexible and technologically literate that the economy needs in the labour market at all levels.

Correspondingly, the NDP III 2020/21- 2024/5 highlights (i) low labour productivity (ii) high youth unemployment (38%) (iii) low transition rates from training to employment (35%) as some of the key challenges to Human Capital Development in Uganda.

In order to overcome these challenges, NDP III 2020/21- 2024/5, under objective 2 peaks the need to train the learners for the urgently needed skills and mainstream a dual education and training system. This paved way for the development of the lower secondary school vocational curriculum which supports both academic and vocational training.

The afore is in line with the Uganda Vision 2040. Under section 261, it emphasises that learners will be accorded opportunities to excel in the skills areas they are placed into. These will range from sports and cut to technical and vocational training. Hitherto, section 262 clearly states that the entire education system will be changed to emphasise practical skills, attitude and moral values.

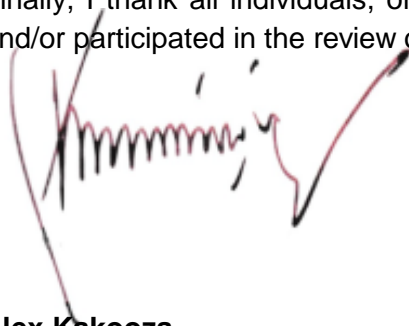
Government of Uganda through the Ministry of Education and Sports rolled out the New Lower Secondary Curriculum in secondary schools countrywide during the first term of the academic year 2020. The overall goal of this curriculum is to produce graduates with employable skills and who are competitive in the labour market. It should be emphasised that vocational training will produce graduates who are employable. In the New curriculum, emphasis will be on equipping learners with employable skills and competencies. This will enable learners perform the requisite duties of the specified occupations. This is the reason why the lower secondary school vocational curriculum was tailored to the assessment requirements of the world of work.

Reading from the Curriculum Framework page 12, it is stated that the learners will be assessed by DIT. Upon assessment and certification, the graduates will be employable and competitive in the labour market. It's against this background that DIT, within its mandate vested in the BTVET Act, 2008 comes on board to take the lead in the development of the requisite Assessment and Training Packages (ATPs) for the various occupations that will be assessed under the Lower Secondary Curriculum.

The ATPs can be used by any training provider and/or those who wish to present themselves for Occupational Assessment and Certification.

Herewith, the Directorate of Industrial Training presents the Assessment and Training Package for training, assessment and certification of a **DOMESTIC BIOGAS TECHNICIAN QUALIFICATION LEVEL 1**.

Finally, I thank all individuals, organisations and review partners who have contributed and/or participated in the review of this noble document.



Alex Kakooza
Permanent Secretary

Executive summary

This Assessment and Training Package is a Competence-Based Education and Training (CBET) tool and consists of three major parts:

- 0.1 **PART I: The Occupational Profile (OP) of a DOMESTIC BIOGAS TECHNICIAN.**
This Occupational Profile which was reviewed by Domestic Biogas Technicians practicing in the world of work mirrors the duties and tasks that Domestic Biogas Technicians are expected to perform.
- 0.2 **PART II: Training Modules** in the form of guidelines to train Domestic Biogas Technicians both on the job as well as in training centres (or combinations of both venues of learning). The Training Modules herein have been reviewed basing on the Occupational Profile and hence are directly relevant for employment.
- 0.3 **PART III: Assessment Instruments** in the form of performance (Practical) and written (theory) test items that can and should be used to assess whether a person complies with the requirements of employment as a DOMESTIC BIOGAS TECHNICIAN. These assessment instruments were reviewed jointly by job practitioners (Domestic Biogas Technicians) and instructors based on the occupational profile and training modules.
- 0.4 While the Occupational Profile (OP) contained in PART I of this document provides the information on **WHAT a person is expected to do** competently in the world of work, the test items, - including performance criteria- of PART III qualify the **HOW and/or HOW WELL a person must do the job.**
- 0.5 The modular format of the curriculum (PART II) allows learners to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration allowing flexibility for learners to move directly into an entry level job, go for further modules or advance to higher levels of training. Modular courses allow more learners to access the training system because training centres as well as companies can accommodate more learners in a given period of time.
- 0.6 In addition to improved access, equity and relevance of BTVET, the UVQF will also enable people who are convinced to have acquired competencies laid down in this ATP through prior training and on-the-job experience to access assessment and certification directly; be it on the basis of a single module, a group of modules or all modules pertaining to the occupation at once. This achievement will facilitate Recognition of Prior Learning (RPL).

0.7 The parts of this Assessment and Training Package were sequentially reviewed as follows:

- i Part 1: Occupational Profile: **August 2020**
- ii Part 2: Training Modules: **August 2020**
- iii Part 3: Assessment Instruments (initial bank): **August 2020**

This ATP (or parts of it) may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions.

DIT takes responsibility of any shortcomings that might be identified in this publication and welcomes suggestions for effectively addressing the inadequacies. The suggestion can be communicated to DIT through P.O. Box 20050, Kampala or through email uvaf.dit@gmail.com.



Patrick Byakatonda
Ag Director

Acknowledgement

The Qualifications Standards Department of DIT wishes to sincerely acknowledge the valuable contributions to the review of this Assessment and Training Package by the following persons, Institutions and organisations:

- Members of the DIT Industrial Training Council,
- The Director and staff of DIT,
- Ministry of Education and Sports,
- The practitioners from the world of work,
- Teachers of Technology and Design from various Secondary Schools,
- Technology and Design Curriculum Specialists from NCDC,
- Examination Specialists from UNEB,
- The facilitators involved in guiding the review panel in their activities,
- The Government of Uganda for financing the review of this ATP.

Abbreviations and acronyms

A&C	Assessment and Certification
ATP	Assessment and Training Packages
CBET	Competency Based Education and Training
DIT	Directorate of Industrial Training
ITC	Industrial Training Council
GoU	Government of Uganda
LWA	Learning-Working Assignment
MC	Modular Curriculum
MoES	Ministry of Education and Sports
OP	Occupational Profile
PEX	Practical Exercise
PTI	Performance (Practical) Test Item
QS	Qualification Standards
RPL	Recognition of Prior Learning
TIB	Test Item Bank
TVET	Technical, Vocational Education and Training
UVQ	Uganda Vocational Qualification
UVQF	Uganda Vocational Qualifications Framework
WTI	Written (Theory) Test Item

Key definitions

Assessment	Assessment is the means by which evidence is gathered and judged to decide if an individual has met the stipulated assessment standards or not. Testing is a form of formal assessment.
Competence	Integration of skills, knowledge, attitudes, attributes and expertise in doing /performing tasks in the world of work to a set standard.
Competency	(Occupational) competence is understood as the ability to perform tasks common to an occupation at an acceptable level.
CBET	Competence-based education and training means that programmes: <ol style="list-style-type: none">1. have content directly related to work2. focus is on 'doing something well'3. assessment is based upon industry work standards, and4. curricula are developed in modular form
Duty	A Duty describes a large area of work in performance terms. A duty serves as a title for a cluster of related Tasks (see also: TASK).
Learning-Working Assignment (LWA)	LWA are simulated or real job situations / assignments that are suitable for learning in a training environment (e.g. "small projects"). In a working environment LWA are real work situations/assignments.
Module	Modules are part(s) of a whole curriculum. Modules can be considered as "self-contained" partial qualifications which are described by learning outcomes or competencies and which can be assessed and certified individually.
Occupational Profile (OP)	<p>An Occupational Profile is an overview of the duties and tasks a job incumbent is expected to perform competently in employment.</p> <p>Occupational Profiles developed by practitioners from the world of work enhance the relevance of training and learning to the requirements of the world of work.</p>

Occupational Profiles which define what a person is supposed to do which become the reference points for developing assessment standards and modular curricula.

Qualification

A qualification is a formal reward for demonstrating competence, based on formal assessment against set standards and provided to the individual in the form of a certificate specifying the nature of the competence.

Task

Job tasks represent the smallest unit of job activities with a meaningful outcome. Tasks result in a product, service, or decision. They represent an assignable unit of work and have a definite beginning and ending point. Tasks can be observed and measured. (*Also see: Duty*)

1.0 ATP-PART I

OCCUPATIONAL PROFILE FOR A DOMESTIC BIOGAS TECHNICIAN

- 1.1 The OCCUPATIONAL PROFILE (OP) for “DOMESTIC BIOGAS TECHNICIAN” below defines the **Duties** and **Tasks** a competent Domestic Biogas Technician is expected to perform in the world of work (on the job) in Uganda and the East African region today.
- 1.2 Since it reflects the skill requirements of work life, the Occupational Profile is the reference document for the subsequent development of training modules and assessment instruments (test items) which are directly relevant to employment in Ugandan and the East African businesses and industries.
- 1.3 To ensure that the Occupational Profile is relevant for employment in Uganda and East Africa, the DIT used the method of “occupational/job profiling.

This approach involves the brainstorming of a panel of 8 to 12 competent job practitioners guided by trained and experienced facilitators. During a two-day workshop the panellists defined the duties and tasks performed in employment, as well as the prerequisite skills, knowledge, attitudes, tools and equipment, and the future trends and concerns in the occupation/job.

- 1.4 The panellists, facilitators and coordinators who participated in developing this Occupational Profile are listed on the following page.

¹ The DACUM-method was used. DACUM is an acronym for ‘Develop A Curriculum’

Job Expert Panel

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NCDC

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St. Elizabeth Girls School Mityana

Kibirige Brian
Gayaza High School

Nalumansi Rose
Kojja SS Mukono

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St. Joseph's Girls SS Nsambya

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Funded by
Government of Uganda



THE REPUBLIC OF UGANDA
Ministry of Education and Sports

Directorate of Industrial Training

Occupational Profile

For a

"Domestic Biogas Technician"

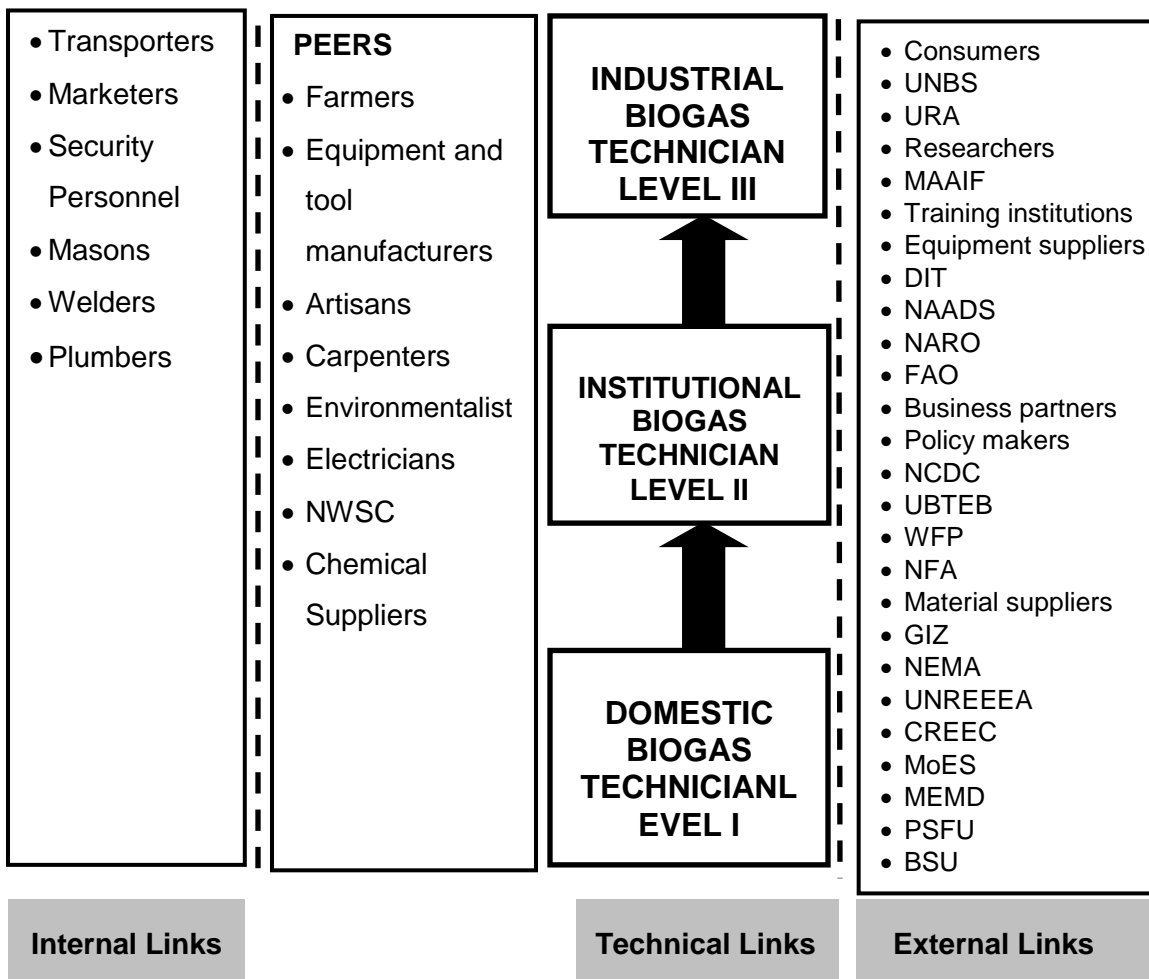
Developed by: Qualification Standards
Department of Directorate of Industrial Training

Dates of workshop: 21st – 25th September 2020

NOMENCLATURE FOR THE OCCUPATION OF A BIOGAS TECHNICIAN

Definition: A **BIOGAS TECHNICIAN** is a person who designs, installs and maintains Biogas systems.

JOB ORGANISATION CHART FOR A BIOGAS TECHNICIAN



Descriptions of the levels in the occupation of “Domestic Biogas Technician”

UVQ Level 1 Domestic Biogas Technician; is a person who interprets drawings, constructs, installs and maintains Biogas systems not exceeding 9m³ capacity.

UVQ Level 2 Institutional Biogas Technician; is a person who interprets drawings, constructs, installs and maintains Biogas Systems not exceeding 30m³

UVQ Level 3 Industrial Biogas Technician; is a person who plans, draws, interprets designs and maintains Biogas systems of any capacity.

Duties and Tasks

A. PLAN BIOGAS PROJECT	A1 Determine user requirements	A2 Carryout feasibility study	A3 Select site
	A4 Assess feed stock availability	A5 Determine digester type and size	A6 Draw system layout
	A7 Determine resources	A8 Determine source and resources	A9 Cost resources
	A10 Prepare budget	A11 Communicate with stake holders	A12 Prepare work plan
	A13 Plan for materials storage		
B. CONSTRUCT BIOGAS SYSTEM	B1 Interpret designs	B2 Excavate digester pit	B3 Prepare foundation
	B4 Build biogas digester	B5 Install biogas digester	B6 Size the pipes and fittings
	B7 Dig trenches	B8 Install pipes and fittings	B9 Fabricate biogas appliances
	B10 Modify biogas appliances	B11 Install biogas appliances	
C. OPERATE BIOGAS SYSTEM	C1 Test for leakages	C2 Prepare feedstock	C3 Feed digester
	C4 Monitor digestion	C5 Test appliances	C6 Monitor biogas levels
	C7 Purify biogas	C8 Generate electricity	C9 Pack biogas
	C10 Make manure	C11 Standardise processes	

D. MAINTAIN BIOGAS SYSTEM	D1 Prepare maintenance Plan	D2 Carryout routine check	D3 Repair appliances
	D4 Replace appliances	D5 Unblock nozzles	D6 Unblock pipes
	D7 Repair digester cracks	D8 Replace facility fittings	

E. MARKET BIOGAS TECHNOLOGY	E1 Carry out market research	E2 Brand biogas technology	E3 Package biogas technology
	E4 Price biogas technology	E5 Advertise biogas technology	E6 Carryout sales promotion
	E7 Distribute biogas technology	E8 Offer after sale services	E9 Disseminate biogas technology

F. PERFORM ADMINISTRATIVE TASKS	F1 Legalise business	F2 Recruit workers	F3 Train workers
	F4 Schedule work	F5 Supervise works	F6 Pay dues
	F7 Motivate workers	F8 Appraise workers	F9 Keep records
	F10 Prepare reports	F11 Counsel workers	F12 Offer internship secure permits
	F13 Commission projects		

G. PERFORM OCCUPATIONAL HEALTH, SAFETY AND ENVIRONMENTAL PROTECTION PRACTICES	G1 Display safety signs	G2 Sensitise stakeholders on OSHE	G3 Practice site hygiene
	G4 Manage hazards	G5 Manage waste	G6 Administer first aid
	G7 Use Personal Protection Equipment		

Additional Information

Generic Knowledge & Skills

1. Tools, equipment and material usage
2. Operation and maintenance
3. Waste disposal and management
4. Safety health and environment
5. Environmental change
6. Quality control
7. Communication skills
8. Information and technological communication (Ict)
9. Financial literacy
10. Problem solving
11. Numeracy and literacy skills
12. Plumbing skills
13. First aid management
14. Team work and cooperation
15. Management of system efficiency
16. Resource mobilisation and management
17. Counselling and guidance of staff
18. Public relations
19. Entrepreneurship skills
20. Marketing skills
21. Negotiation skills
22. Time management
23. Types of transport
24. Staff training and monitoring skills
25. Analytical skills
26. Record keeping
27. Business and customer service skills
28. Quality and types of materials
29. Cleaning and purification skills
30. Human resource management
31. Planning leadership skills
32. Sizing bio digester
33. Diagnostic skills
34. Construction skills
35. Conflict management

Tools, Materials and Equipment

1. Working table
2. Knives
3. Holding containers e.g. (Basins, Buckets)
4. Pangas
5. Gloves
6. Trowels
7. Helmet
8. Masks
9. Industrial boots
10. Overalls
11. Files
12. Filling cabinet
13. Office desk
14. First aid kit
15. Spade
16. Wheelbarrow
17. Spanners
18. Crashing machine
19. Weighing scale
20. Screw driver
21. Gas cylinder
22. Grinder
23. Pliers
24. Nails
25. Clips
26. Valves
27. Horse pipes
28. Compressor
29. Welding plan
30. Hacksaw
31. Molds
32. Computer programs
33. Transport means
34. Forked hoe
35. Rake
36. Slasher
37. Hammer
38. Tape measure
39. Hoe
40. Spade
41. Pick axe
42. Pipe cutter
43. Building string
44. Spirit level
45. Plumb bob
46. Jerrycan
47. Wrench
48. Pliers
49. Paint brush
50. Hacksaw
51. Brush
52. Brooms
53. Nozzles
54. Purifying machine
55. Knife
56. Pounding rod
57. PH metre
58. Pressure gauges
59. Flow rate metre
60. Hand saw
61. Stationary
62. ICT gadgets
63. Digester
64. Taps and dies
65. PPR machine
66. Tubes

Attitudes / Traits / Behaviour	Trends and Concerns
1 Self-motivated	1. Advancement in technology
2 Trust worthy	2. Increase in specialisation
3 Honest	3. Increased production costs
4 Hard working	4. Highly skilled personnel
5 Tolerant	5. Unfavourable waste management policies
6 Team work	6. Public mind set about the process of extraction of Biogas and feedstock
7 Good time management	7. Improved quality of products of Biogas
8 Committed	8. Packing and distribution of Biogas
9 Flexible	9. Competition from other sources of energy i.e. Solar energy
10 Good listener	
11 Competitive but cooperative	
12 Innovative and creative	
13 Responsible	
14 Physically fit	
15 Knowledgeable	
16 Patient	
17 Social	
18 Polite	
19 Calm	
20 Respectful	
21 Confident	
22 Intelligent	
23 Logical	
24 Trainable	
25 Co-operative	
26 Tidy	
27 Persistent	

2.0 ATP-PART II

Training Modules for a DOMESTIC BIOGAS TECHNICIAN

- 2.1 A curriculum is a “guide / plan for teaching and learning” which provides a guide to teachers, instructors and learners. In the envisaged system of competence-based or outcome-oriented education and training (CBET), Curricula are no longer the benchmark against which assessment is conducted. It is rather the Occupational Profile and the related Test Items that provide the benchmark for assessment as well as for Curriculum development.
- 2.2 This modular format of the curriculum allows learners of the Domestic Biogas Technician occupation to acquire job specific skills and knowledge (i.e. competencies) module by module. A single module can be accomplished within a relatively short duration of allowing learners to move directly into an entry level job, do further modules and advance to higher levels of training. Modular courses allow more learners to access the training system because training centres as well as companies can accommodate more learners in a given period of time.
- 2.3 The modules were developed jointly by both instructors from training centres and job practitioners. They were developed using the Occupational Profile as a reference point and taking into account the specifications of training and learning outcomes in the form of Test Items described in Part II.
- 2.4 The modules contain “Learning-Working Assignments” (LWAs) and related “Practical Exercises” (PEXs) as key elements.
- LWAs are simulated or real job situations / assignments that are suitable for learning in a training environment (e.g. “small projects”). In a working environment, LWAs are real work situations.
- PEXs are therefore sub-sets of a LWA.
- 2.5 In principle, and following the philosophy of Competence-Based Education and Training (CBET), the modules can be used as a guide for learning in a training centre or at the work place; or combinations of both.

WHO IS A DOMESTIC BIOGAS TECHNICIAN QUALIFICATION LEVEL 1?

A Domestic Biogas Technician Level 1 is a person who interprets drawings, constructs, installs and maintains Biogas systems not exceeding 9m³capacity.

TRAINING MODULES FOR A DOMESTIC BIOGAS TECHNICIAN UVQ LEVEL 1

Code	Module Title	Average duration	
		Contact hours	Weeks
UE/DBT/M1.1	Construct Biogas System	168	4
UE/DBT/M1.2	Manufacture Biogas Units	360	9
UE/DBT/M1.3	Operate Biogas System	320	8
UE/DBT/M1.4	Manage Biogas Business	168	4
Summary	4 training modules	1016	25

Note: Average duration is contact time but NOT calendar duration

It is assumed that:

- 1 day is equivalent to 8 hours of nominal learning and
- 1 month is equivalent to 160 hours of nominal learning.

Information given on the average duration of training should be understood as a guideline. Quick learners may need less time than indicated or vice versa.

At completion of a module, the learner should be able to satisfactorily perform the included Learning Working Assignments, their Practical Exercises and attached theoretical instruction, as the minimum exposure.

Prior to summative assessment by recognised Agencies, the users of these Module Guides are encouraged to carefully consider continuous assessment using samples of (or similar) performance (practical) and written test items available in part 3 of this ATP.

Code	UE/DBT/M1.1
Module title	M1.1: Construct and Install Biogas System
Related Qualification	<u>Part of:</u> Uganda Vocational Qualification (Domestic Biogas TechnicianUVQ1)
Qualification Level	1
Module purpose	After completion of this module, a trainee shall be able to construct and install Biogas digester
Learning-Working Assignments (LWAs)	<p>LWA 1/1: Build Biogas Digester LWA 1/2: Install Pre-fabricated Digester LWA 1/3: Install Pipes and Fittings LWA 1/4: Install Biogas Appliances LWA 1/5: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> 1. <i>The learning exercises may be repeated until the trainee acquires targeted competence;</i> 2. <i>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment</i>
Related Practical Exercises (PEXs)	<p>LWA 1/1: Build Biogas Digester PEX 1.1: Interpret system drawings PEX 1.2: Excavate pit PEX 1.3: Prepare foundation PEX 1.4: Lay bricks PEX 1.5: Plaster digester PEX 1.6: Paint digester PEX 1.7: Backfill pit</p> <hr/> <p>LWA 1/2: Install Pre-fabricated Digester PEX 2.1: Interpret drawing PEX 2.2: Prepare foundation PEX 2.3: Place digester PEX 2.4: Assemble parts PEX 2.5: Test performance</p>

	<p>LWA 1/3: Install Pipes and Fittings PEX 3.1: Interpret layout PEX 3.2: Size pipes and fittings PEX 3.3: Excavate trenches PEX 3.4: Lay pipes and fittings PEX 3.5: Install inspection chambers PEX 3.6: Construct inspection chambers PEX 3.7: Test for leakages PEX 3.8: Cast manhole covers PEX 3.9: Install manhole covers PEX 3.10: Backfill trenches</p> <p>LWA 1/4: Install Appliances PEX 4.1: Install stoves PEX 4.2: Install Lamps PEX 4.3: Install cookers PEX 4.4: Install brooders PEX 4.5: Install water heaters PEX 4.6: Connect biogas generator</p> <p>LWA 1/5: Perform Occupational Health, Safety and Environmental Protection Practices PEX 5.1: Display safety signs PEX 5.2: Sensitise stakeholders on OSHE PEX 5.3: Manage hazards PEX 5.4: Observe site hygiene PEX 5.5: Manage waste PEX 5.6: Administer first aid PEX 5.7: Wear Personnel Protection Equipment</p>
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> • Interpretation of drawing • Types of digesters • Construction knowledge

	<ul style="list-style-type: none"> • Tools and equipment usage • Measurements skills • Safety aspect • Types of Materials • Fabrication • Plumbing • Procurement • Communication skills • Standards and regulations • Numeracy • Literacy • ICT
Average duration of learning	168 hours (21 days) of nominal learning suggested to include: <ul style="list-style-type: none"> • 3 days of occupational theory and • 18 days of occupational practice
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided that all equipment and materials required for this module training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related written test items from item bank.
Minimum required tools/ equipment/ implements or equivalent	slasher, hammer, working table, tape measure, hoe, pangas, spade, pick axe, pipe cutter, building string, spirit level, plumb bob, jerry can, wheelbarrow, pipe wrench, pliers, spanners, paint brush, threading die, hacksaw, brush, brooms, first aid kit, buckets, basins, trowel, helmet
Minimum required materials and consumables or equivalent	books, pens, papers, cement, sand, stone aggregates, paint, bricks, water, pipes, wire mesh, dome pipe, stove fittings, feedstock, de-sulphuriser, pressure gauge, detergent
Special notes	

Code	UE/DBT/M1.2
Module title	M1.2: Manufacture Biogas Units
Related Qualification	<u>Part of:</u> Uganda Vocational Qualification (Domestic Biogas TechnicianUVQ1)
Qualification Level	1
Module purpose	After completion of this module, a trainee shall be able to fabricate units of Biogas system
Learning-Working Assignments (LWAs)	<p>LWA 2/1: Fabricate Digester LWA 2/2: Fabricate Biogas Stove LWA 2/3: Fabricate Desulphuriser LWA 2/4: Fabricate Gas Cylinder LWA 2/5: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> <i>The learning exercises may be repeated until the trainee acquires targeted competence;</i> <i>The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment</i>
Related Practical Exercises (PEXs)	<p>LWA 2/1: Fabricate Digester PEX 1.1: Interpret drawing PEX 1.2: Size biogas system PEX 1.3: Acquire materials PEX 1.4: Cut materials to size PEX 1.5: Fit materials to the chambers PEX 1.6: Assemble chambers PEX 1.7: Test system</p> <p>LWA 2/2: Fabricate Biogas Stove PEX 2.1: Interpret drawing PEX 2.2: Fabricate frame PEX 2.3: Cast burner PEX 2.4: Machine nozzles</p>

	<p>LWA 2/3: Fabricate Desulphuriser PEX 3.1: Interpret drawing PEX 3.2: Cut materials PEX 3.3: Thread pipes PEX 3.4: Assemble pipes and fittings PEX 3.5: Insert purifying agent</p> <hr/> <p>LWA 2/4: Fabricate Gas Cylinder PEX 4.1: Interpret drawing PEX 4.2: Cut materials PEX 4.3: Thread pipes PEX 4.4: Assemble pipes and fittings PEX 4.5: Test cylinder leakages</p> <hr/> <p>LWA 2/5: Perform Occupational Health, Safety and Environmental Protection Practices PEX 5.1: Wear personnel protective equipment PEX 5.2: Display safety warning signs PEX 5.3: Administer first aid PEX 5.4: Manage waste PEX 5.5: Manage fire outbreaks</p>
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> • Technical drawing skills • Fabrication • Hand and power tools usage • Moulding • Measurements • Construction • Types of materials • Machining • Safety, health and environmental protection issue • Procurement

	<ul style="list-style-type: none"> • Communication skills • Standards and regulations • Numeracy • Literacy • ICT
Average duration of learning	360hours (45 days) of nominal learning suggested to include <ul style="list-style-type: none"> • <i>5days of occupational theory and</i> • <i>40days of occupational practice</i>
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided that all equipment and materials required for this module training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related written test items from item bank.
Minimum required tools/ equipment/ implements or equivalent	livestock hives, slashers, protective gears, smoker, wind vein, nails, pliers, pair of scissors, chisels, grinder, tape measure, screw driver, pliers, spanners, nails, clips, valves, horse pipes, compressor, welding plan, hacksaw, moulds, files
Minimum required materials and consumables or equivalent	sheet metals, horse pipes, valves, PVC containers, welding rods, screws, purifying agent (e.g. iron wool)
Special notes	

Code	UE/DBT/M1.3
Module title	M1.3: Operate Biogas System
Related Qualification	Part of: Uganda Vocational Qualification (Domestic Biogas Technician UVQ1)
Qualification Level	1
Module purpose	After completion of this module, the trainee should be able to manage Biogas system and prepare Biogas products
Learning-Working Assignments (LWAs)	<p>LWA 3/1: Prepare Feedstock LWA 3/2: Feed Biogas Digester LWA 3/3: Maintain Biogas System LWA 3/4: Prepare Biogas Products LWA3/5: Commission Biogas System LWA 3/6: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> 1. The learning exercises may be repeated until the trainee acquires targeted competence; 2. The trainer is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment.
Related Practical Exercises (PEXs)	<p>LWA 3/1: Prepare Feedstock PEX 1.1: Sort Materials PEX 1.2: Crush Materials</p> <p>LWA 3/2: Feed Biogas Digester PEX 2.1: Ratio materials PEX 2.2: Slurrify feedstock PEX 2.3: Load digester PEX 2.4: Monitor digester</p> <p>LWA 3/3: Maintain Biogas System PEX 3.1: Test system PEX 3.2: Prepare maintenance plan PEX 3.3: Carryout routine checks PEX 3.4: Repair fittings PEX 3.5: Repair appliances PEX 3.6: Repair digester cracks PEX 3.7: Prepare maintenance records</p>

	<p>LWA 3/4: Prepare Biogas Products PEX 4.1: Purify biogas PEX 4.2: Dry slurry PEX 4.3: Pack manure flakes PEX 4.4: Pack biogas</p> <p>LWA 3/5: Commission Biogas System PEX 5.1: Train users PEX 5.2: Standardise process PEX 5.3: Prepare user manual PEX 5.4: Test run system PEX 5.5: Prepare commissioning reports</p> <p>LWA 3/6: Perform Occupational Health, Safety and Environmental Protection Practices PEX 6.1: Wear personnel protective equipment PEX 6.2: Display safety warning signs PEX 6.3: Administer first aid PEX 6.4: Manage disposal of slurry</p>
Occupational health and safety	Precautions, rules and regulations on occupational health, safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None
Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> • Value addition • Types of feedstock • Maintenance of biogas system • System monitoring • Purification • Rationing • Measurement • Marketing • Communication skills • Health, safety and environmental protection practices • Standards and regulations • Metering

	<ul style="list-style-type: none"> • Numeracy • Literacy • Tools and equipment usage • ICT
Average duration of learning	320hours (40 days) of nominal learning suggested to include: <ul style="list-style-type: none"> • <i>5 days of occupational theory and</i> • <i>35 days of occupational practice</i>
Suggestions on organisation of learning	The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided that all equipment and materials required for this module training are in place.
Assessment	Assessment to be conducted according to established regulations by a recognised assessment body using related written test items from item bank
Minimum required tools/ equipment/ implements or equivalent	wheelbarrow, garden folk, spanners, crashing machine, machine, weighing scale, measuring tape, basins, buckets, screw drivers, gas cylinder, nozzles, purifying machine, rake, panga, knife, pounding rod, jerrycan, water vessels, pH metre, pressure gauges, flow rate metre, compressors, hand saw, Horse pipes, stationary, ICT gadgets, digester, taps and dies, wrench, hammer, hacksaw, tape measure, thread tapes, PPR machine, pair of pliers, trowel, tubes
Minimum required materials and consumables or equivalent	mortar, steel wire, weeds, biogas, sacks, animal waste, market waste, food waste, fats, H ₂ O hythen
Special notes	

Code	UE/DBT/M1.4
Module title	M1.4: Manage Biogas Business
Related Qualification	<u>Part of:</u> Uganda Vocational Qualification (Domestic Biogas Technician UVQ1)
Qualification Level	1
Module purpose	After completion of this model, a trainee shall be able to start and manage a profitable biogas business
Learning-Working Assignments (LWAs)	<p>LWA 4/1: Market Biogas Technology LWA 4/2: Develop User Manual LWA 4/3: Keep Records LWA 4/4: Mobilise Resources LWA 4/5: Manage Human Resource LWA 4/6: Perform Occupational Health, Safety and Environmental Protection Practices</p> <p>Note:</p> <ol style="list-style-type: none"> <i>The learning exercises may be repeated until the trainee acquires targeted competence</i> <i>The trainee is advised to deliver relevant theoretical instruction with demonstrations as required to perform each learning working assignment</i>
Related Practical Exercises (PEXs)	<p>LWA 4/1: Market Biogas Technology PEX 1.1: Carryout market research PEX 1.2: Brand biogas technology PEX 1.3: Price biogas technology PEX 1.4: Advertise biogas technology PEX 1.5: Package biogas technology PEX 1.6: Distribute biogas products PEX 1.7: Disseminate biogas technology PEX 1.8: Exhibit biogas technology PEX 1.9: Offer after sales services PEX 1.10: Host clients</p> <p>LWA 4/2: Develop User Manual PEX 2.1: Test run system PEX 2.2: Develop standard parameters PEX 2.3: Train users PEX 2.4: Draft SOPs</p>

	<p>LWA 4/3: Keep Records PEX 3.1: Take daily records PEX 3.2: Write reports PEX 3.3: Keep books of accounts PEX 3.4: Prepare inventory</p> <p>LWA 4/4: Mobilise Resources PEX 4.1: Source for funds PEX 4.2: Procure tools, equipment and materials PEX 4.3: Procure appliances PEX 4.4: Procure system units PEX 4.5: Recruit staff</p> <p>LWA 4/5: Manage Human Resource PEX 5.1: Train workers PEX 5.2: Develop work plan PEX 5.3: Supervise work PEX 5.4: Remunerate workers PEX 5.5: Motivate workers PEX 5.6: Offer Internship PEX 5.7: Appraise workers PEX 5.8: Manage conflict</p> <p>LWA 4/6: Perform Occupational Health, Safety and Environmental Protection Practices PEX 6.1: Display safety signs PEX 6.2: Administer first aid PEX 6.3: Manage waste PEX 6.4: Manage hazards PEX 6.5: Sensitise stakeholders PEX 6.6: Practice site hygiene PEX 6.7: Provide personnel protection equipment</p>
Occupational health and safety	Precautions, rules and regulations of applications safety and environmental protection, included in the listed related knowledge should be observed and demonstrated during LWAs and PEXs.
Pre-requisite modules	None

Related knowledge/ theory	<p><i>For occupational theory suggested for instruction/ demonstration, the trainer is not limited to the outline below. In any case, related knowledge/ theory may be obtained from various recognised reference materials as appropriate:</i></p> <ul style="list-style-type: none"> • Value addition • Maintenance of biogas system • System monitoring • Measurement • Marketing • Communication skills • Health, safety and environmental protection practices • Standards and regulations • Metering • Numeracy • Literacy • Tools and equipment usage • ICT • Financial management • Record keeping • Human resource management • Costing • Branding • Budgeting • Research and development • Business planning • Operation of Biogas systems • Procurement
Average duration of learning	<p>168hours (21 days) of nominal learning suggested to include:</p> <ul style="list-style-type: none"> • <i>6 days of occupational theory and</i> • <i>15 days of occupational practice</i>
Suggestions on organisation of learning	<p>The acquisition of competencies (skills, knowledge, attitudes) described in this module may take place at a training centre or its equivalent provided that all equipment and materials required for this module training are in place.</p>
Assessment	<p>Assessment to be conducted according to established regulations by a recognised assessment body using related written test items from item bank.</p>

Minimum required tools/ equipment/ implements or equivalent	working table and chairs, filing cabinets, communication devices, computer programs, transport means, boots, helmets, overalls
Minimum required materials and consumables or equivalent	books, pens, packaging materials, iron sheets, airtime, data, flip charts, detergents and gloves
Special notes	

3.0 ATP-PART III

Assessment Instruments for a DOMESTIC BIOGAS TECHNICIAN

- 3.1 Assessment of occupational competence is the procedure by which evidence is gathered and judged to decide if an individual (candidate) has met the stipulated assessment standards or not. In this ATP the **standards** to assess occupational competences are reflected in the form of the Occupational Profile and related Test Items.
- 3.2 Assessment of occupational competence should comprise both practical (performance) testing and written (theory/knowledge) testing.
- 3.3 Based on the Occupational Profile, a combined panel of job practitioners and Instructors developed a substantial number of test items for assessing (practical) performance as well as items for assessing occupational knowledge (theory) all stored in an electronic Test Item Bank (TIB) at Directorate of Industrial Training.
- 3.4 Performance (Practical) Test Items (PTI) are closely related to typical work situations in Ugandan business and manufacturing enterprises. They comprise a test assignment for candidates and assessment criteria and/or scoring guides for assessors' use.
- 3.5 Written Test items (WTI) for written testing of occupational theory, (knowledge) are presented in different forms which include:
- Short answer test items.
 - Multiple choice test items and,
 - Matching test items, These WTIs herein focus on functional understanding as well as trouble-shooting typically synonymous with the world of work.
- 3.6 Composition of assessment / test papers will always require good choices of different types of WTI in order to ensure the assessment of relevant occupational knowledge required of candidates to exhibit competence.
- 3.7 The test items contained in the Test Item Bank may be used for continuous / formative assessment during the process of training as well as for summative assessment of candidates who have acquired their competences non-formally/or informally.
- 3.8 In this document, samples of test items for assessing both performance (practical) and occupational knowledge (theory) of DOMESTIC BIOGAS TECHNICIAN are included.
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3.9 Overview of test item samples included:

No.	Type of Test Item	Numbers included
1	Written (Theory)- short answer	2
2.	Written (Theory)- multiple choice	2
3.	Written (Theory)- matching item with generic	2
4.	Written (Theory)- matching item with cause and effect	2
5.	Written (Theory)- matching item (work sequence)	2
6.	Performance (Practical) test items	1
	Total	11

WRITTEN TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Written (Theory) Test Item- no.1			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer	√		
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.1			
Time allocation:	2 minutes			

Test Item	Give three uses of desuphuriser.
Answer spaces	(i) (ii) (iii)
Expected key (answers)	(i) To purify biogas of Sulphur (ii) To clean biogas of impurities (iii) To remove hydrogen sulphide

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 2			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer	√		
	Multiple choice			
	Matching item	Generic	Cause- Effect	Work- sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.2			
Time allocation:	3 minutes			

Test Item	Mention any four examples of feedstock
Answer spaces	(i) (ii) (iii) (iv)
Expected key (answers)	(i) Livestock manure e.g. cow dung, pig dung, goat dung, sheep dung, donkey dung (ii) Poultry manure (iii) Municipal waste (iv) Kitchen waste (v) Energy crops e.g. maize silage, sugar beets, water hyacinth (vi) Factory organic waste e.g. bagasse, Brewer's grain (vii) Human waste (viii) Fat waste

DIT/ QS	Test Item Database Written (Theory) Test Item- no. 3			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice	√		
	Matching item	Generic	Cause-Effect	Work-sequence
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.1			
Time allocation:	2 minutes			

Test Item	What is the purpose of a biogas system drawing?
Distractors and correct answer	A. Guide the builder B. Guide the user C. Attract the user D. Attract the builder

Key (answer)	A
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 4			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice	√		
	Matching item	Generic	Cause-Effect	Work-sequence
Complexity level:	C1			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	2 minutes			

Test Item	The following are the primary products of biogas system
Distractors and correct answer	A. Biogas Fuel and biogas stove B. Biogas fuel and organic manure C. Biogas Lamp and Biogas fuel D. Organic manure and electricity

Key (answer)	B
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 5			
Occupational Title:	Domestic Biogas Technician			
Qualification level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
		√		
Complexity level:	C2			
Date of OP:	September 2020			
Related tasks:	M1.1			
Time allocation:	4 minutes			

Test Item	Match the following parts of a biogas system with their corresponding functions
------------------	---

Column A (Parts)	
1	Digester
2	Expansion chamber
3	Relief valve
4	Loading chamber

Column B (Functions)	
A	Regulate pressure
B	Produce biogas
C	Inspect gas line
D	Regulate pipeline pressure
E	Feed digester
F	Mixing feedstock

Key (answer)	1-B, 2-A, 3-D, 4-E
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DIT/ QS	Test Item Database Written (Theory) Test Item- no. 6			
Occupational Title:	Domestic Biogas Technician			
Qualification level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
		√		
Complexity level:	C2			
Date of OP:	September 2020			
Related tasks:	M1.4			
Time allocation:	5 minutes			

Test Item	Align the following challenges with their respective solutions
------------------	--

Column A (Challenge)	
A	Gas doesn't burn well
B	Frame is orange and not clear
C	Slurry from the overflow has a low pH
D	Blocked inlet pipe

Column B (Solutions)	
1	Open and check inside digester
2	Add lime or cattle dung to increase the pH
3	Check gas pipes for leakage
4	Install water trap and open it frequently
5	Ensure a proper solid to liquid ratio is used
6	Abandon system for a new one

Key (answer)	A-3, B-4, C-2, D-5
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DIT/ QS	Test Item Database Written (Theory) Test Item- No. 7			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
			√	
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	4minutes			

Test Item	Match the following effects with their possible causes in biogas operations
------------------	---

Column A (Causes)	
1	Poor workmanship
2	Accumulation of water vapour
3	Overfeeding of digester
4	External objects from digester
5	Welding machine

Column B (Effects)	
A	High flow rates
B	Pipe blockage
C	Cracks in digester
D	Low pressure at appliances
E	Incomplete digestion
F	Temperature rise in digester

Key (answer)	1-C, 2-D, 3-E, 4-B
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DIT/ QS	Test Item Database Written (Theory) Test Item- No.8			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
			√	
Complexity level:	C2			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	4 minutes			

Test Item	Match the following bad Safety, Health and Environmental practices with their effects
------------------	---

Column A (Causes)	
1	Absence of safety signs
2	Lack of first aid
3	Poor waste management
4	Lack of PPEs

Column B (Effects)	
A	Accidents
B	Causality
C	Pollution
D	Injury
E	Protection
F	Direction
G	Rescue

Key (answer)	1-A, 2-B, 3-C, 4-D
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DIT/ QS	Test Item Database Written (Theory) Test Item- No.9			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
				√
Complexity level:	C2			
Date of OP:	September 2020			
Related modules:	M1.1			
Time allocation:	5 minutes			

Test Item	Arrange the following steps followed when building a biogas system
-----------	--

Column A (chronology)	Column B (work steps) in wrong chronological order	
1 st	A	Build biogas digester
2 nd	B	Install pipes and fittings
3 rd	C	Install appliances
4 th	D	Prepare foundation
5 th	E	Size pipes and fittings
6 th	F	Excavate digester pit
7 th	G	Interpret drawings
8 th	H	Excavate pipe trenches

Key (answer)	1-G, 2-F, 3-D, 4-A, 5-E, 6-H, 7-B, 8-C
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DIT/ QS	Test Item Database Written (Theory) Test Item- No.10			
Occupational Title:	Domestic Biogas Technician			
Competence level:	Level 1			
Code no.				
Test Item type:	Short answer			
	Multiple choice			
	Matching item	Generic	Cause-Effect	Work-sequence
				√
Complexity level:	C3			
Date of OP:	September 2020			
Related module:	M1.3			
Time allocation:	5 minutes			

Test Item	Arrange the following steps followed in feeding a biogas digester
-----------	---

Column A (chronology)	Column B (work steps) in wrong chronological order	
1 st	A	Acquire materials
2 nd	B	Grade materials
3 rd	C	Ration materials
4 th	D	Sort materials
5 th	E	Load digestion
6 th	F	Monitor digestion
7 th	G	Purify feedstock

Key (answer)	1-A, 2-D, 3-B, 4-C, 5-G, 6-E, 7-F
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PERFORMANCE TEST ITEMS (SAMPLES)

DIT/ QS	Test Item Database Performance Test Item- No.11
Occupational Title:	Domestic Biogas Technician
Competence level:	Level 1
Code no.	
Test Item:	Install a 2m ³ pre – fabricated biogas system with 1 lamp and a stove on an existing foundation in a homestead.
Complexity level:	P2
Date of OP:	September 2020
Related modules:	M1.1
Related skills and knowledge:	<ul style="list-style-type: none"> • Interpretation of drawing • Types of digesters • Construction knowledge • Tools and equipment usage • Measurements skills • Safety aspect • Types of Materials • Fabrication and Plumbing • Communication skills • Standards and regulations • Numeracy • Literacy
Required tools, Materials and Equipment:	Hacksaw blade, tape measure, pliers, drilling machine, trowels, hammer, screw driver, pipe wrench, die, PPR machine, silicon gun, PPR pipes, PVC pipes, stoves, lamps, valves, pressure gauge, flow meter, thread tape, nails, screws, solvent cement, digester, drawings, silicon, horse pipes, nozzles
Time allocation:	8 Hours
Preferred venue:	Site
Remarks for candidates	<ul style="list-style-type: none"> • Wear protective gear
Remarks for assessors	<ul style="list-style-type: none"> • Avail with tools, equipment and pre – fabricated material • Provide a helper

#	Assessment criteria	Scoring guide	Max. Score	
			Process	Result
1	Preparation for the task	Wore protective gear i.e. Overall		1
		Helmet		1
		Gumboots		1
		Gloves worn last Goggles		1
		Verify materials	4	
		Prepare tools and equipment		3
		Prepare materials - digester parts, units, pipes and fittings		4
2	Install pre-fabricated system	Interpretation of drawings observed		4
		Checking of foundation observed	3	
		Fitted digester parts	4	
		Placed digester on foundation		2
		Assembled other digester parts	4	
		Fitted pipes		
		- General pipeline	2	
		- Line to lamp	2	
		- Line to stove	2	
		- Line to pressure gauge	2	
		Tested for leakages		4
3	Install Appliances	Fixed lamp		1
		Assembled stove parts	3	
		Assembled stove parts		2
		Connected stove to biogas system	1	
		Tested for leakages	4	
		Safety signs provided		3

#	Assessment criteria	Scoring guide	Max. Score	
			Process	Result
4	Perform after installation activities	Managed waste	2	
		Managed waste		2
		Cleaned site observed		2
		Cleaned tools and equipment	2	
		Cleaned tools and equipment		2
		Stored tools and equipment		1
		Provided user guidelines		2
		Trained users	4	
		Managed PPEs	2	
	TOTAL		41	37
	Maximum score (Y)	X/Y	78	

4.0 ATP- PART IV

INFORMATION ON DEVELOPMENT PROCESS

4.1 Occupational Profile Developed (September 2020)

The Occupational Profile was exclusively developed by job practitioners who were working in the Domestic Biogas Technician occupation, Secondary school teachers who double as examiners of Technology and Design with the Uganda National Examination Board (UNEB) and Curriculum Development Specialists working with the National Curriculum Development Centre (NCDC).

The job expert panel, guided by UVQF Facilitators defined duties and tasks performed and provided additional generic information regarding the occupation.

4.2 Training Module Development (September 2020)

Based on the Occupational Profile for Domestic Biogas Technician, Training Modules were developed by job practitioners, guided by UVQF Facilitators.

4.3 Test Item Development (September 2020)

Based on the Occupational Profile for Domestic Biogas Technician, and Training Modules, Test Items were developed by combined panels of instructors and job practitioners, guided by UVQF Facilitators.

4.4 Methodology

The rationale for the Assessment and Training Package development was to link Vocational Education and Training to the real world of work by bridging Occupational Standards to Training Standards through industry-led Standards-Based Assessment.

Active participation of both instructors and job practitioners' panels consolidated the development philosophy.

The panellists worked as teams in workshop settings complemented by off-workshop field research and literature review activities including international benchmarking.

4.5 Development Panel

The participating panel of Job Practitioners required for different stages of the Assessment and Training Package i.e. occupational profile, training modules, assessment instruments were constituted by members from the following organisations;

Development Panel		
No.	Name	Institution/ Organisation
1.	JanjaBernard	NCDC
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4.6 Facilitator team

This Assessment and Training Package was developed by a Facilitator team listed below:

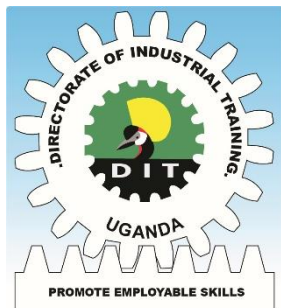
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4.7 Reference Time:

The Assessment and Training Package was compiled in September 2020 and may be periodically revised to match the dynamic trends in the occupation and hence issued in different versions

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