SECTION A:	***QUALIFICATION DETAILS***																	
QUALIFICATION DEVELOPER (S)	Woo International																	
TITLE	Certificate IV in Solar Water Heating Installation and Maintenance														***NCQF LEVEL***		*4*	
FIELD	Manufacturing, Engineering and Technology			***SUB-FIELD***	Solar Water Heating										***CREDIT VALUE***		*61*	
New Qualification								✓	*Review of Existing Qualification*									
SUB-FRAMEWORK	*General Education*					*TVET*								*Higher Education*				
QUALIFICATION TYPE	*Certificate*	*I*		*II*		*III*		*IV*	✓	*V*		*Diploma*		*Bachelor*				
	Bachelor Honours			*Post Graduate Certificate*								*Post Graduate Diploma*						
	Masters								*Doctorate/ PhD*									

RATIONALE AND PURPOSE OF THE QUALIFICATION

RATIONALE:

HRD Sector Skills Plans (2017) indicators identifies demand for people with solar water heating installation and maintenance at this level, to support productive safe work that contributes to economic growth of different sectors of the economy that are dependent on skilled human resources domain

Labour statistics analysis list solar water heating installation and maintenance as one of the occupational trades which are in high demand; on the other hand Government NDP 11 has identified various mega development projects that will require solar water heating installation and maintenance services, and continues to encourage the use renewable energy as friendly green option. This thus raises demand for human

resources with solar water heating installation and maintenance competencies and qualified with a suit of skills required in these jobs.

The qualification could contribute to address the national problem of unemployed youth and increase the employability of graduates in certain vocational areas with acquisition of solar water heating installation and maintenance skills.

This qualification will further serve the needs of the society and the economy by providing solar water heating installation and maintenance services

It will help in producing competent learners who are able to contribute to improved productivity and efficiency within the engineering support environment. They will be able to work according to legislative, regulatory, quality assurance requirements and industry standards.

PURPOSE:

The purpose of this qualification is to produce graduates who have specialised knowledge, skills, and competences to:

- Interpret technical drawings and plans.
- Apply knowledge of solar energy in solar water heating systems.
- Install solar water heating systems.
- Diagnose and repair faults and maintaining solar water heating system.
- Undertake the routine service of a solar water heating systems.
- Test, commission, and handover domestic solar water heating systems installations

ENTRY REQUIREMENTS (including access and inclusion)

Minimum entry Requirements:

- Certificate III (NCQF Level 3) or equivalent.
- There shall be consideration for RPL and CAT according to national RPL and CAT policies

SECTION B	***QUALIFICATION SPECIFICATION***
GRADUATE PROFILE (LEARNING OUTCOMES)	***ASSESSMENT CRITERIA***
LO 1. Interpret technical drawings and plans	1.1 Interpret project specifications from construction drawings. 1.2 Use symbols, layouts, and signs applicable to SWH technology. 1.3 Calculate quantities of equipment and materials required for a specific task.
LO 2. Apply knowledge of water theory and solar energy in solar water heating systems.	2.1 Apply principles of renewable energy. 2.2 Determine water quality in solar water heating systems. 2.3 Apply principles and methods of solar energy optimization. 2.4 Locate different components in a domestic solar water heating system. 2.5 Store different solar water heating materials and equipment.
LO 3. Install domestic solar water heating systems.	3.1 Prepare and set out work area according with drawings. 3.2 Install and connect pipes and wiring in accordance with job specifications. 3.3 Mount solar heating systems on different types of roofs. 3.4 Install and fix solar water heating systems in accordance with drawings or instructions.

	3.5 Observe safety requirements when working at heights and lifting loads.
LO 4. Test and commission domestic solar water heating systems installations	4.1 Conduct visual inspection of water heating systems. 4.2 Test solar water heating systems for proper installation and leaks. 4.3 Test pipping and connections for free flow and leak. 4.4 Complete final installation completeness checklist. 4.5 Document test, commission and handover reports in accordance with establishment requirements.
LO 5. Carry out routine service and maintenance of solar water heating elements.	5.1 Assess installed solar water heating systems in accordance with maintenance requirements. 5.2 Identify and rectified faults in accordance with maintenance requirements. 5.3 Complete maintenance records in accordance with establishment procedures.

SECTION C	***QUALIFICATION STRUCTURE***				
COMPONENT	***TITLE***	***Credits Per Relevant NCQF Level***			***Total*** ***(Per** Subject/ Course/ Module/ Units)*
		Level [ ]	***Level [ ]***	***Level [ ]***	
FUNDAMENTAL COMPONENT *Subjects/ Courses/ Modules/Units*	Occupational Safety in the workplace	3			2
	Read and interpret technical drawings	3			2
	Working at Heights		***4***		3
	Team and Interpersonal Skills	3			2
CORE COMPONENT *Subjects/Courses/ Modules/Units*	Theory of Water	3			3
	Solar Energy	3			2
	Solar Water Heating Components		4		3
	Solar Water Heating Systems,		4		4
	SWH Systems Preparation, Installation and Maintenance		4		5
	SWH system Pipework		4		5
	Sizing		4		5

	Solar Water Heating system Mounting		4		3
	Solar Water Heating System Installations		4		5
	SWH System Maintenance and repair		4		5
	Test And Commission SWH System.		4		5
	SWH Tools, Equipment	3			2
ELECTIVE/ OPTIONAL COMPONENT *Subjects/Courses/ Modules/Units*	Solar PV system		4		5
	Renewable Energy Systems		4		5
	Electricity and electronics		4		5
	Install Electric High Pressure Geyser		4		5
	TOATAL CREDITS				***61***

SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL	
TOTAL CREDITS PER NCQF LEVEL	
NCQF Level	***Credit Value***
3	16
4	45
TOTAL CREDITS	***61***

Rules of Combination:

(Please Indicate combinations for the different constituent components of the qualification)

This Certificate IV in SWH Installations and Maintenance comprises 61 credits, comprising of Fundamental, Core and elective Components.

Fundamental Components:

The Fundamental components consist of foundational knowledge to the value of **09** credits all of which are compulsory.

Core Components:

The core components consist of modules containing applied knowledge and practical skills to the value of **47** credits which are compulsory.

Elective Components:

Learners are to choose elective unit standard to the value of at least **5** credits to attain a minimum of 61credits for the qualification.

ASSESSMENT ARRANGEMENTS

- Assessment will include both formative and summative modes.
- Formative assessment will contribute 50% to the overall course grade. Summative assessment will constitute the other 50% of the overall course grade.
- Assessment shall be carried out by BQA accredited Assessors.
- Assessment will be carried out in accordance with the institutional policies and in line with the national policy.

MODERATION ARRANGEMENTS

The sole purpose of moderation is to make sure that assessment and marking across all courses is fair, valid and reliable. It also aligns the assessment tool to the outlined learning outcomes, that it is set at an appropriate level of study and that the process of marking is consistently done.

- There will be both Internal Moderation and External moderation
- Moderation for assessment shall be carried out by BQA accredited moderators.
- Moderation will be done in accordance with the institutional policies and in line with the national policy.

RECOGNITION OF PRIOR LEARNING

This qualification is designed to enable award through RPL assessment, in accordance with RPL policy.

CREDIT ACCUMULATION AND TRANSFER

This qualification is designed to enable award through CAT, in accordance with CAT policy.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Horizontal Pathways

- Certificate IV in Plumbing and Pipefitting
- Certificate IV in Solar PV Installation and Maintenance
- Certificate IV in Electrical Installation and Maintenance

Vertical Pathways

- Certificate V in Solar Water Heating Installation and Maintenance
- Certificate V in Plumbing and Pipefitting
- Certificate V in Electrical Installation and Maintenance
- Certificate V in Solar PV Installation and Maintenance

Employment Pathways

- Solar Water Heating Artisans
- Pipe fitters

QUALIFICATION AWARD AND CERTIFICATION

Qualification Award:

Candidates are required to achieve a minimum of 61 credits of 61 to be awarded the Certificate IV in Solar Water Heating Installation and Maintenance qualification.

Certification:

Graduate will be issued with a certificate and an official transcript at award.

REGIONAL AND INTERNATIONAL COMPARABILITY

The development of this qualification was informed and guided by a comparison with other similar qualifications nationally, regionally and internationally, against common criteria feature of qualifications and their uses. The criteria used included but was not limited to:

i) Naming by subfield or domain of the vocation, and fit to a level of competence
ii) Credits outcomes expression and presentation of qualification
iii) Exit and specific learning outcomes and their nature in terms of type
iv) Rules of combination for the qualification in terms of contribution of weighting of outcomes
v) Prescribed contribution of modules such as core, fundamental, elective and the type of domains packaged
vi) Delivery strategies and assessment methods, together with type of assessment decisions made
vii) Availability of moderation as quality assurance of the assessment to increase trust on results and credibility of results

The comparability was done as a desk research task of comparing similar level qualifications from Botswana, South Africa and New Zealand. The aim of the comparison was to inform this design and attain [arity of esteem of this with similar benchmarks.

Similarities: all qualifications reviewed are at specified NQF level, use similar credits system, subfield classification and are expressed in outcomes-based format

NB: Please find attached Comparability Matrix

REVIEW PERIOD

Every Five (5) years.