

BQA NCQF QUALIFICATION TEMPLATE

SECTION A: QUALIFICATION DETAILS													
QUALIFICATION DEVELOPER (S)				Joint Technical Training School (Botswana Defence Force)									
TITLE		Diploma In Armament Engineering						NCQF LEVEL		6			
STRANDS (where applicable)		N/A											
FIELD		Manufacturing, Engineering and Technology			SUB-FIELD		Engineering and Engineering Trades			CREDIT VALUE		360	
New Qualification					✓		Legacy 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: The qualification is designed to produce highly skilled technicians specializing in Armament primarily weaponry. This qualification directly addresses a critical need within the Botswana Defence Force (BDF) which is responsible for the defence and security of the country. The BDF holds a substantial inventory of large calibre weaponry which requires expert servicing and maintaining to ensure their longevity and optimum performance. The Training Needs Analysis (TNA) conducted by JTTS in conjunction with the Corps of Armament Services in April 2023 detailed that the organization relies heavily on external technicians from the Original Equipment Manufacturers (OEM), particularly for refurbishment and complex repair of													

BDF's ordnance. This dependence creates financial strain and potential vulnerabilities due to reliance on external entities. Furthermore, the loss of those who were trained at the time of acquisition of the equipment has exacerbated the skill deficit.

This qualification is therefore of strategic importance to the organization and the country. By developing indigenous expertise, the BDF will enhance its self-reliance, reduce operational costs and ensure continuous availability of highly competent technicians. This will lead to improved maintenance and serviceability of defence assets.

The development of this qualification also aligns with The Botswana Education and Training Sector Strategic Plan (ETSSP 2015-2020) which prioritizes human capital development to transition Botswana towards a knowledge-based economy through recognition of the role of polytechnics and technical training schools in improving trained technical man power for our industries and field organizations. Further reinforcing this effort, the qualification is guided by the Human Resource Development Council (HRDC) Sector Plans (2017-2022), which highlight the need for specialized skills in defense, engineering, and manufacturing to support Botswana's long-term development and self-reliance goals.

PURPOSE: (itemise exit level outcomes)

The purpose of this qualification is to produce graduate with advanced knowledge, skills and competence to:

1. Conduct comprehensive inspections of various armament systems in accordance with manufacturer's procedures and guidelines before, during, and after firing.
2. Prepare detailed inspection reports and documentation for various armament systems using standardized templates and procedures under diverse operational conditions.
3. Manage the maintenance, repair, and operational procedures of armament systems, ensuring compliance with national security regulations and international standards.
4. Apply core engineering principles to troubleshoot, analyze, and propose solutions for complex technical issues related to armament system functionality and effectiveness.

MINIMUM ENTRY REQUIREMENTS (including access and inclusion)

The minimum entry requirement:

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1. Certificate IV, NCQF Level 4 or equivalent.
2. Access through RPL will be provided through ETP policies in line with CAT and RPL national policies.

(Note: Please use Arial 11 font for completing the template)

SECTION B		QUALIFICATION SPECIFICATION	
GRADUATE PROFILE (LEARNING OUTCOMES)		ASSESSMENT CRITERIA	
1. Troubleshoot and fix faults in armament systems as per manufacturer's manual effectively and efficiently		1.1 Identify and diagnose faults in diverse armament systems following structured diagnostic methodologies such as Root Cause Analysis (RCA), using by appropriate tools and test equipment. 1.2 Disassemble and assemble components of a gun as per set procedures. 1.3 Apply corrective measures to resolve faults in accordance with standard operating procedures (SOPs) 1.4 Record the troubleshooting process and outcomes in a detailed report.	
2. Perform routine maintenance to ensure sustainability of the firing mechanisms of various guns		2.1 Inspect firing mechanisms for wear, damage, or malfunction incorporating life cycle data and projected service intervals. 2.2 Clean, lubricate, and adjust firing mechanisms in accordance with preventive maintenance protocols and to life cycle management strategies 2.3 Replace defective components using maintenance schedules, integrating approved substitute parts in accordance with manufacturer guidelines. 2.4 Test firing mechanisms to verify functionality implementing safety protocols.	
3. Apply engineering design principles and analytical skills to assess, assemble, and evaluate weapon systems for optimal functionality and effectiveness		3.1 Identify and differentiate between key components and subsystems of guns and mortars, articulating their functions, configurations, and interdependencies.	

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	3.2 Analyse the dynamics of action of mechanisms of weapon systems during firing cycles. 3.3 Disassemble and assemble weapon components. 3.4 Design basic modifications or adaptations according to standard weapon system components to meet specified operational scenarios 3.5 Test the functionality of the assembled weapon.
4. Inspect, diagnose, and validate armament systems functionality, incorporating quality control and testing protocols.	4.1 Identify critical components and systems that require detailed inspection and assessment. 4.2 Develop a comprehensive inspection checklist and procedures for different types of armament systems. 4.3 Conduct inspections in accordance with established protocols and safety standards. 4.4 Document findings and recommendations in a technically accurate and clear report.
5. Demonstrate individual accountability and manage technical processes related to the design, development, implementation, and sustainment of armament systems.	5.1 Apply leadership and management principles during the performance of armament maintenance tasks. 5.2 Implement risk management strategies to ensure conducive armament operations. 5.3 Apply resource management techniques to optimize personnel, time and material in armament activities

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6. Apply advanced communication skills effectively both orally and in writing within armament engineering context to both technical and non-technical stakeholders.	6.1 Prepare inspection reports following standardized templates and forms 6.2 Complete maintenance logs for specified weapon systems. 6.3 Covert drawings of weapon components into step-by-step repair guides. 6.4 Interpret and convey technical information effectively in both oral and written forms. 6.5 Develop effective business communication skills
7. Demonstrate understanding of ethical responsibilities, professional conduct, and regulatory frameworks relevant to armament engineering practice.	7.1 Interpret and apply defense-specific legal and regulatory frameworks related to armament systems, including national weapons regulations, safety protocols, and international compliance agreements. 7.2 Advise on appropriate armament handling actions using established codes of ethics, professional standards, and decision-making models.

SECTION C	QUALIFICATION STRUCTURE				
COMPONENT	TITLE	Credits Per Relevant NCQF Level			Total Credits
		Level [4]	Level [5]	Level [6]	
FUNDAMENTAL COMPONENT Subjects/Courses/Modules/Units	Mathematics		10		10
	Physics		10		10
	Computer Technology		6		6
	Technical Drawing		8		8
	Workshop Technology I		10		10
	Technical Communication		6		6
	Entrepreneurship skills		5		5
	Mathematics II			10	10
CORE COMPONENT Subjects/Courses/Modules/Units	Basic Armament Systems			10	10
	Basic Ammunition			10	10
	Basic Small Arms		10		10
	Machining I			10	10
	Material Science		10		10
	Artillery Weapon Systems			10	10

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	Fluid Power Systems			10	10
	Mortars			10	10
	Troubleshooting and Maintenance		10		10
	Anti-Tank Weapons		10		10
	Air Defence Weaponry		10		10
	Tanks			10	10
	Fluid Power in Weapon Systems I			10	10
	Principles of Management			5	5
	Fluid Power in Weapon Systems II			10	10
	Advanced Electrical Engineering			10	10
	Advanced Electronic Engineering			10	10
	Range Management			5	5
	Ethics, Regulation, and Legal Frameworks			5	5
	Guided Weapons			10	10

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	Strength of Materials			10	10
	Design and Synthesis			10	10
	Workshop Practice		5	5	10
	Final Project			10	10
	Apprenticeship		40	20	60
	<i>Subjects/ Courses/ Modules/Units</i>	Credits Per Relevant NCQF Level			Total Credits
STRANDS/ SPECIALIZATION		Level []	Level []	Level []	
1.Electives					
	155mm Towed Independent Gun (TIG)			10	10
	155mm Autonomous Truck Mounted Ordnance System (ATMOS)			10	10

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SUMMARY OF CREDIT DISTRIBUTION FOR EACH COMPONENT PER NCQF LEVEL

TOTAL CREDITS PER NCQF LEVEL

NCQF Level	Credit Value
5	170
6	190
TOTAL CREDITS	360

Rules of Combination:

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

To achieve the qualification, a learner must complete a minimum of 360 credits comprising 50 credits from Fundamental modules, 300 credits from Core modules, and at least 10 credits from Elective modules.

ASSESSMENT ARRANGEMENTS

ASSESSMENT

Assessment will be integrated, made up of Formative and Summative Assessment.

Formative Assessment

Formative assessment will be administered throughout the learning period in the form of written tests and practical and formative assessment shall contribute 50% of the final grade of the course.

Summative Assessment

A summative assessment will be administered at the end of each module. Summative assessment shall contribute 50% to the course final grade.

Assessment will be conducted by BQA registered and accredited assessors. Assessors must possess a minimum qualification of Bachelor of Engineering in Armament Engineering or related field with a teaching and assessment qualification (e.g. PGDE, CVET, DVET, PGDHE).

MODERATION ARRANGEMENTS

MODERATION

Both internal and external moderation processes will be carried out by BQA registered and accredited moderators in line with institutional policies.

Moderators must possess a minimum qualification of Bachelor of Engineering in Armament Engineering or related field. The moderator should be a highly experienced assessor with a teaching, assessment and moderation qualification.

RECOGNITION OF PRIOR LEARNING

RPL will be applicable for gaining credits towards the qualification accordance to ETP policies that align with national RPL policies.

CREDIT ACCUMULATION AND TRANSFER

CAT will be applicable for gaining credits towards the qualification accordance to ETP policies that align with national CAT policies.

PROGRESSION PATHWAYS (LEARNING AND EMPLOYMENT)

Learning Pathways

Horizontal Articulation

1. Diploma in Small Arms Engineering
2. Diploma in Mechanical Engineering

Vertical Articulation:

1. Bachelor of Engineering in Mechanical Engineering.
2. Bachelor of Engineering in Industrial Engineering.
3. Bachelor of Engineering in Small Arms Engineering

Employment Pathways

1. Armament Technicians.
2. Workshop Managers.

QUALIFICATION AWARD AND CERTIFICATION

QUALIFICATION AWARD: To be awarded the qualification of Diploma in Armament Engineering, a candidate should satisfy the requirements of the qualification, which is 360 Credits; 50 Credits of Fundamental modules, 230 Credits of Core modules and 10 Credits Elective modules.

CERTIFICATION: Upon successful completion of all requirements of the qualification, the ETP shall issue transcripts and certificates to the graduates.

SUMMARY OF REGIONAL AND INTERNATIONAL COMPARABILITY

Finding detailed information on military courses, especially those related to armament Engineering, is challenging due to the specialized and often confidential nature of the content. As a result, detailed information on curriculum, assessment methods, and specific learning outcomes is rarely publicly available. This lack of transparency makes it difficult to obtain data for comparison. Despite these challenges, the following qualifications from India and **Ethiopia**, which have well-established defense and military training system are comparable to this qualification:

1. SIMILARITIES

a. Title of Qualification, NQF Level, and Credit Value or Duration

Botswana and Ethiopia offer the only full-length diplomas titled “Armament Engineering,” with both engineering orientation and military context.

The Diploma in Armament Engineering offered by the *Joint Technical Training School* in Botswana is registered at NCQF Level 6, with a duration of three years and a total of 360 credits. It is designed to blend engineering principles with defense-specific competencies.

Similarly, Ethiopia's Defense Engineering College offers a *Diploma in Armament Engineering*, also structured as a three-year qualification and estimated at ENQF Level 6, though with a credit value of approximately 180–200 credits based on Ethiopian qualification standards. The qualification balances military application with foundational engineering education.

b. Main Exit Outcomes

Each qualification is designed to produce technicians capable of diagnosing, maintaining, and supporting weapon systems in defense settings. They all emphasize procedural compliance, system readiness, and functional competence in high-risk, high-precision environments.

c. Domains/Modules/Courses/Subjects

Core subjects across all qualifications include ballistics, armament mechanics, weapon systems maintenance, and safety protocols. Where available, curricula involve practical training, component-level diagnostics, and field-service simulation.

2. DIFFERENCES

a. Duration

With exception of In India, the *Army A.D. College* delivers a Diploma in Armament Technology at NSQF Level 6. This is a one-year qualification focused predominantly on maintenance and field-level armament operations, with an emphasis on procedural compliance.

c. Domains/Modules/Courses/Subjects

With lack of explicit information on modules of comparable qualifications, it is challenging to deduce the similarities or differences in modules. However, from the little accessible information available (online), the local course core modules align with those it was benchmarked against.

Graduates can articulate horizontally to Diploma in Small Arms Engineering, Diploma in Mechanical Engineering and vertically to Bachelor's Degree in Mechanical Engineering and Bachelor Degree in Industrial Engineering. Graduates can work as armament technician and workshop managers. The qualification compares well with those benchmarked against.

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REVIEW PERIOD

This qualification will be reviewed after 5 years upon registration.

For Official Use Only:

CODE (ID)			
REGISTRATION STATUS	BQA DECISION NO.	REGISTRATION START DATE	REGISTRATION END DATE
LAST DATE FOR ENROLMENT	LAST DATE FOR ACHIEVEMENT		
REVISION DATE:		NAME OF PROFESSIONAL BODIES/REGULATOR Y	