No. 127 **13 February 2004**

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

Chemical Industries

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following qualifications and unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualifications and unit standard. The qualifications and unit standard can be accessed via the SAQA web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 13 March 2004.*** All correspondence should be marked **Standards Setting – SGB for Chemical Industries** and addressed to

The Director: Standards Setting and Development
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JOE SAMUELS
DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

National Certificate in Explosives Operations: NQF Level 2

Registration number:

Field	:	Manufacturing, Engineering and Technology
Sub- field	:	Manufacturing and Assembly
Credits	:	120
Issue date	:	
Review date	:	

Rationale for the qualification

This qualification reflects the workplace-based needs as expressed by employers and employees for both now and for the future for occupational related qualifications in the explosives industry.

Per organization a diverse product range can be produced ranging from 10 to 40 different products and with up to 180 different components per product. The explosives manufacturing industry cannot be considered as a typical manufacturing industry where machinery and equipment are used to perform the transformation of raw materials into final products with no or little specialised hand skills, except in the case of ammonium nitrate based explosives. Neither are typical artisan related actions utilised during the primary conversion process. Somewhere in-between these extremes the operator in the explosives industry finds himself / herself.

Currently the range of typical learners is a semi-skilled worker with little or some formal education.

A qualifying learner will be able to operate as a valuable team member within explosives operations processes. This will provide valuable training, embedded knowledge and fundamental experience towards a career within a variety of manufacturing related processes, especially explosive materials operations that will be beneficial to an individual and also to the economy/ industry.

This qualification provides the learner with accessibility to be employed within the manufacturing industry and especially within the explosives material-manufacturing domain and will be providing portability and articulation possibilities within the chemical manufacturing contexts.

Purpose of qualification

A person acquiring this qualification will be able to operate and monitor machinery and complete post production operations, using and caring for tools and equipment whilst adhering to specific safety requirements, risk, quality and environmental requirements and specifications under supervision. The qualification enables the person to participate in routine explosives manufacturing processes and to start specializing in a specific explosives manufacturing area such as, propellants, explosives accessories, initiating systems or small arms ammunition.

This qualification will contribute to the full development of the learner within the explosives material manufacturing fraternity by providing recognition, further mobility and transportability within the chemical and related manufacturing field.
The skills, knowledge and understanding demonstrated within this qualification are essential for social and economic transformation and contribute to the progression and economic growth within the manufacturing fraternity.

This qualification will allow a person to advance to learning in explosive material manufacturing NQF 3.

Access to the Qualification
Access to this qualification is open.

Learning assumed to be in place

- A knowledge, comprehension and application of language, mathematics, natural science and technology on NQF 1. A GETC qualification with an exposure to chemical or explosives operations would be beneficial.

Exit level Outcomes

The exit level outcomes for this qualification reflect a combination of specific outcomes and critical cross-field education and training outcomes. The way in which the critical outcomes have been advanced through the learning required for this qualification is embedded in the unit standards, ie how it is reflected and assessed in the context of the specific outcomes.

Exit level 1: Interpret and use knowledge in performing tasks related to explosive raw material mixing, sampling and wide-ranging manufacturing processes.
Associated assessment criteria

- o Identify and solve problems using known solutions to familiar problems.
- o Maintain safety, health, environmental and good manufacturing practices in a manufacturing environment, as a team member that are essential for economic development of the society at large.
- o Hazardous, non-hazardous material and explosive materials are handled and treated according to legislative requirements.

Exit level 2: Use science and technology required during propellant manufacturing operation, assembling of components and post-production operations.
Associated assessment criteria

- o Maintain equipment operating procedures and post production procedures according to safety, quality and operating procedures.
- o Assemble components and use designated tools
- o Work effectively with others in a team
- o Operate propellant manufacturing operations according to standard operating procedures
- o Collect and organise manufacturing quality control charts and records

Exit level 3: Use science and technology required during initiating devices manufacturing operation, assembling of machinery and post-production operations.
Range: initiating devices may include electronic, electric or non –electric initiation devices
Associated assessment criteria

- o Maintain equipment operating procedures and post production procedures according to safety, quality and operating procedures.
- o Assemble components and use designated tools
- o Work effectively with others in a team
- o Operate manufacturing operations according to standard operating procedures
- o Collect and organise manufacturing quality control charts and records

Exit level 4: Use science and technology required during explosive accessories manufacturing operation, assembling of machinery and post-production operations.
Range: Explosive accessories may refer to detonating cord, safety fuse, igniter cords, shock tube (nonel), delay elements and boosters.
Associated assessment criteria

- Maintain equipment operating procedures and post production procedures according to safety, quality and operating procedures.
- Assemble components and use designated tools
- Work effectively with others in a team
- Collect and organise manufacturing quality control charts and records
- Operate electronic manufacturing operations according to standard operating procedures
- Collect and organise manufacturing quality control charts and records

Exit level 5: Use science and technology required during small arms ammunition manufacturing operation, assembling of components, setting of machinery and post-production operations.
Associated assessment criteria

- Maintain equipment operating procedures and post production procedures according to safety, quality and operating procedures.
- Assemble components and use designated and tools
- Work effectively with others in a team
- Operate small arms ammunition manufacturing operations according to standard operating procedures
- Collect and organise manufacturing quality control charts and records

The assessment criteria of the qualification are embodied in the unit standards. The knowledge, skills and understanding will be assessed across several specialised contexts and are clearly defined within the relevant specific outcomes, assessment criteria and range statements within these unit standards

International comparability

Benchmarking was done against international standards and qualifications from the NVQ from Britain, New Zealand Qualification Authority, the American Qualification Curriculum and Assessment Authority Frameworks and the US Manufacturing Skills Standards

No direct comparable qualification could be found. A qualification in New Zealand **National Certificate in Extraction Industries Level 2-4** (Land operations using explosives), has 5 comparable unit standards on handling of explosives. The newly designed South African unit standards compare fairly well with existing New Zealand unit standards. But given South Africa's competitive edge and leader in this field world wide, it explains why no other related qualifications were found.

Integrated Assessment
The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a candidate is able to achieve all the exit level outcomes of this qualification.

Identifying and solving problems, team work, organising one-self, using of applied science, the implication of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflexive competencies assessment methods and tools to determine the whole person development and integration of applied knowledge and skills.

Applicable assessment tool(s) to establish the foundational, reflective and embedded knowledge to problem solving and application of the world as a set of related systems within the manufacturing and maintenance field.
A detailed portfolio of evidence is required to prove practical, applied and foundational competencies of the learner.
Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.
Unit standards in the qualification must be used to assess specific and critical cross-field outcomes. During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflective competencies.

Recognition of prior learning
This qualification may be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. A learner wishing to be assessed towards this qualification may arrange to do so without attending any further training or education. The assessor and the learner will jointly decide on the most appropriate method to be taken.

Articulation possibilities
This qualification will allow a person to advance to learning of explosives operations qualification at NQF level 3 or a similar qualification at this level. The qualification provides the learner with flexibility to pursue careers in the explosive material manufacturing industry and articulation within chemical related manufacturing environments. .

Moderation Options

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant ETQA.
- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes as well as the integrated competence described in the qualification.

Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

Criteria for registration of assessors

For an applicant to register as an assessor, the applicant needs:
Interpersonal skills, subject matter expertise and assessment experience.
The assessor needs to be competent in the planning and conducting assessment of learning outcomes as described in the unit standard Plan and conduct assessment of learning outcomes NQF level 5. The subject matter experience must be well developed within the field of explosive operations and quality assurance practices.
The assessor must have completed:

- A similar qualification or from the same family of qualifications, at or above NQF 4, or
- National Certificate in Explosives Operations NQF 4.

The subject matter experience of the assessor can be established by recognition of prior learning.
Assessors need to be registered with the relevant Education and Training Quality Assurance Body.

National Certificate in Explosives Operations NQF 2 (120)

Fundamental	NLRD	L	C	Core	SGG codes	NLRD	L	C	Elective (Choose a minimum of 31 credits)	SGG codes	NLRD	L	C
Field of Communication and Language				Demonstrate an understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment	EXP C 205		2	8	Operate propellant manufacturing equipment	EXP E 202 206 225	TBD	2	10
Maintain and adapt oral communication.	8962	2	5	Demonstrate understanding of the behaviour, performance and uses of explosives	EXP C 201		2	8	Operate explosive accessory manufacturing equipment	EXP E 202 209-212	TBD	2	10
Access and use information from texts.	8963	2	5	Assemble components		9877	2	12	Operate initiating device manufacturing equipment in an explosive manufacturing environment	EXP E 202 213-220		2	10
Write for a defined context.	8964	2	5	Demonstrate an understanding of quality principles used in the chemical industry	GEN 1005	12199	1	4	Operate small arms ammunition manufacturing equipment	EXP E 202 222-226	TBD	2	10
Use language and communication in occupational learning programmes.	8967	2	5	Read and adjust instruments on production or packaging equipment		12317	2	7	Operate hydraulic & pneumatic presses in an explosives environment	EXP E 203		2	6
Field of Physical, Mathematical, Computer and Life Sciences				Destroy hazardous waste and redundant explosives	EXP C 204		2	7	Anticipate and troubleshoot machine malfunctioning		9090	2	6
Apply basic knowledge of statistics in order to investigate life and work related problems.	14085	2	3						Prepare and treat metal surfaces of empty containers or components in the manufacturing environment	EXP E 201		2	6
Identify, describe, compare, classify, explore shape and motion in 2- and 3-dimensional shapes in different contexts.	9008	2	3						Transport & store explosives and explosive containing materials	EXP E 230		2	6
Use mathematics to investigate and monitor the financial aspects of personal and community life.	7469	2	2						Decontaminate equipment and work surfaces in an explosive manufacturing environment	EXP E 204		2	5
Work with a range of patterns and functions and solve problems.	9007	2	5						Operate an x-ray machine	EXP E 207		2	4
Apply process chemistry and related technology in the chemical industry	14782	2	10						Control waste or effluent water in a manufacturing environment	EXP E 224		2	4
									Apply sampling theory and practice in the chemical industry	Gen 2002	14784	2	5
									Mix explosive and non-explosive materials	EXP E 228 229		2	6

									Develop a learning plan and portfolio for assessment		12465	2	6
									Perform basic first aid		12483	2	4
									Use a personal computer operating system.		7548	2	3
									Operate a personal computer system.		7647	2	6
									Demonstrate knowledge of and produce computer spreadsheets using basic functions		7572	2	3
Total		**2**	**43**	**Total**				**46**	**Total**				**110**

TITLE: **Operate explosives accessories manufacturing equipment**

NLRD ID:

NQF Level: 2

Credits: 10

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in an explosive manufacturing environment who has the responsibility of operating the explosive accessories manufacturing equipment in order to produce non-electronic initiating devices.

A person credited with this unit standard is able to:
- Demonstrate knowledge of the explosive accessories manufacturing,
- Prepare to manufacture non-electronic initiating devices,
- Manufacture non-electronic initiating devices,
- Perform end of explosive accessories manufacturing procedures.

Range: Explosive accessories manufacturing refers to waxing, lead melting and various inspection and testing procedures.
Explosive accessories may refer to detonating cord, safety fuse, igniter cords, shock tubes (nonel), delay elements or boosters

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system ABET level 3
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.
- Hazardous materials and explosive materials properties and characteristics
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of the explosive accessories manufacturing.
Assessment Criteria:
1.1 The facility, equipment and utilities in an explosive accessories plant are identified according to purpose, function and position in the plant or process.

1.2 The operating principles of equipment in the explosive accessories plant are described according to standard operating principles.
1.3 Property changes of the materials used in the explosive accessories manufacturing process are identified according to the materials' characteristics.
1.4 The movement of raw material through the explosive accessories plant are identified according to relevant site process parameters.

Specific Outcome 2: Prepare to manufacture explosive accessories

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.
2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.
2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.
2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.
2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Manufacture explosive accessories.

Assessment Criteria:

3.1 Explosive accessories equipment is started, operated and controlled according to standard operating procedures.
3.2 Materials are fed at the required rate and quantity as per standard operating procedures.
3.3 Product and process parameters are controlled and recorded according to standard operating procedures.
3.4 Samples are taken according to standard operating procedures and requirements.
3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of explosive accessories manufacturing procedures.

Assessment Criteria:

4.1 Materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.
4.2 Materials or products are stored according to standard operating procedures.
4.3 Equipment is shut down according to standard operating procedures.
4.4 Sub-standard product is handled according to standard operating procedures.
4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.
4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.
4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.
4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	40 h
Recommended time spent in structured learning in the workplace and assessment	60h
Total notional hours	100h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Demonstrate an understanding of the behaviour, performance and uses of explosives**

NLRD ID:

NQF Level: 2

Credits: 8

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works or wants to start a career in the explosive manufacturing environment where hazardous materials would be handled. Knowledge regarding properties, behaviour, performance, safety requirements, identification and uses of hazardous materials in explosive material and ammunition manufacturing environment is essential for safe and effective working conditions.

A person credited with this unit standard is able to:
- o Identify types and categories of explosive materials,
- o Identify and explain explosive material properties.
- o Select the correct explosive type for the particular application.

Explosive materials refer to:
- o high and low explosives,
- o primary and secondary explosives,
- o military and commercial explosives,
- o dynamites,
- o ammonium nitrate fuel oil explosives,
- o slurries and water-gel explosives,
- o emulsion explosives

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

LEARNING ASSUMED TO BE IN PLACE

Description of required skills, knowledge and understanding on:
- o Understand and use the number system, ABET level 3.
- o Read and respond to a range of text types, ABET level 3.
- o Handle and use explosive materials manually
- o Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Identify types and categories of explosive materials.
Assessment Criteria:

1.1 Various types of explosive materials are identified according to visual and behaviour characteristics.
1.2 South African examples are identified and named according to various types and categories of explosive materials.
1.3 Explosives manufactured or used in the learners working environment are identified and categorised according to main types.
1.4 A typical explosion reaction and impact of each explosion reaction is descried and according to explosive characteristics.
Range: A typical reaction must included detonation, deflagration, transfer from one process to the other.

Specific Outcome 2: Identify and explain explosive material properties.
Range: Properties refer to sensitivity to friction, heat, sparks, shock, impact, explosion reaction, velocity of detonation, chemical stability and typical products formed upon explosion
Assessment Criteria:

2.1 The typical properties of each type of explosive are recognised and explained according to basic explosive reactions.
2.2 Detonation as a typical process of high explosive reactions is explained according to basic explosive reactions.
2.3 Deflagration as a typical process of low explosives is explained according to basic explosive reactions.
2.4 Explosives manufactured or used in working environment are identified according to explosive material properties using site examples.

Specific Outcome 3: Select the correct explosive type for the particular application.
Range: The uses of explosives in the South African environment refer to electric and non-electric detonators, boosters, primers, percussion caps, power cartridges, delay elements, detonating cords, safety fuse, igniter cord, main charges, warheads, propellants, demolition charges, bombs and mines.
Assessment Criteria:

3.1 Explosive trains are described according to explosive characteristics and properties.
3.2 Typical uses of explosives are identified in the south African context
3.3 Main types of explosives are identified for typical applications in the military and commercial environment
3.4 Specific explosives as manufactured or used in the learners working environment are identified as the best option for a particular application.
3.5 The reasons for selecting a specific explosive for a specific application are explained according the properties and characteristics of explosives.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.

- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because the process is moderate in range, established and familiar and offers clear choices of routine responses. The learning demand employs basic operational knowledge and readily available information. The application of this unit standard is to qualify the person for certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	60 h
Recommended time spent in structured learning in the workplace and assessment	20h
Total notional hours	80h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to select applicable products and applications.

2. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting properties and characteristics of explosive materials.

3. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods.

4. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Demonstrate an understanding of the behaviour, performance and uses of explosives

NLRD ID:

NQF Level: 2

Credits: 8

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works or wants to start a career in the explosive manufacturing environment where hazardous materials would be handled. Knowledge regarding properties, behaviour, performance, safety requirements, identification and uses of hazardous materials in explosive material and ammunition manufacturing environment is essential for safe and effective working conditions.

A person credited with this unit standard is able to:
- Identify types and categories of explosive materials,
- Identify and explain explosive material properties.
- Select the correct explosive type for the particular application.

Explosive materials refer to:
- high and low explosives,
- primary and secondary explosives,
- military and commercial explosives,
- dynamites,
- ammonium nitrate fuel oil explosives,
- slurries and water-gel explosives,
- emulsion explosives

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

LEARNING ASSUMED TO BE IN PLACE

Description of required skills, knowledge and understanding on:
- Understand and use the number system, ABET level 3.
- Read and respond to a range of text types, ABET level 3.
- Handle and use explosive materials manually
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Identify types and categories of explosive materials.
Assessment Criteria:

1.1 Various types of explosive materials are identified according to visual and behaviour characteristics.
1.2 South African examples are identified and named according to various types and categories of explosive materials.
1.3 Explosives manufactured or used in the learners working environment are identified and categorised according to main types.
1.4 A typical explosion reaction and impact of each explosion reaction is descried and according to explosive characteristics.
Range: A typical reaction must included detonation, deflagration, transfer from one process to the other.

Specific Outcome 2: Identify and explain explosive material properties.
Range: Properties refer to sensitivity to friction, heat, sparks, shock, impact, explosion reaction, velocity of detonation, chemical stability and typical products formed upon explosion
Assessment Criteria:

2.1 The typical properties of each type of explosive are recognised and explained according to basic explosive reactions.
2.2 Detonation as a typical process of high explosive reactions is explained according to basic explosive reactions.
2.3 Deflagration as a typical process of low explosives is explained according to basic explosive reactions.
2.4 Explosives manufactured or used in working environment are identified according to explosive material properties using site examples.

Specific Outcome 3: Select the correct explosive type for the particular application.
Range: The uses of explosives in the South African environment refer to electric and non-electric detonators, boosters, primers, percussion caps, power cartridges, delay elements, detonating cords, safety fuse, igniter cord, main charges, warheads, propellants, demolition charges, bombs and mines.
Assessment Criteria:

3.1 Explosive trains are described according to explosive characteristics and properties.
3.2 Typical uses of explosives are identified in the south African context
3.3 Main types of explosives are identified for typical applications in the military and commercial environment
3.4 Specific explosives as manufactured or used in the learners working environment are identified as the best option for a particular application.
3.5 The reasons for selecting a specific explosive for a specific application are explained according the properties and characteristics of explosives.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.

- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because the process is moderate in range, established and familiar and offers clear choices of routine responses. The learning demand employs basic operational knowledge and readily available information. The application of this unit standard is to qualify the person for certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	60 h
Recommended time spent in structured learning in the workplace and assessment	20h
Total notional hours	80h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to select applicable products and applications.

2. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting properties and characteristics of explosive materials.

3. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods.

4. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Operate propellant manufacturing equipment in an explosive manufacturing environment

NLRD ID.:

NQF Level: 2

Credits: 10

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in an explosive manufacturing environment who has the responsibility of operating the propellant manufacturing equipment in order to produce propellants.

A person credited with this unit standard is able to:
- Demonstrate knowledge of propellant manufacturing,
- Prepare to manufacture propellants,
- Manufacture propellants,
- Perform end of propellant manufacturing procedures.

Range: Propellant manufacturing refers to impregnation, centrifugation, filtration, gelatinisation and extrusion processes.
Propellants may refer to single base, double base, triple base, rocket, composite and ball powders.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system ABET level 3
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.
- Hazardous materials and explosive materials properties and characteristics
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment
-

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of propellant manufacturing.
Assessment Criteria:
1.1 The facilities, equipment and utilities in a propellant plant are identified according to purpose, function and position in the plant or processes.

Range: Equipment may refer to pumps, vessels, agitators, hoppers, temperature indicators, pressure indicators, valves and heat exchangers, cooling towers, centrifuge and filtration equipment.

1.2 The operating principles of equipment in the propellant plant are described according to standard operating principles.

1.3 Property changes of the materials used in the propellant manufacturing process are identified according to the materials' characteristics.

1.4 The movement of explosives and other raw material through the propellant plant are identified according to relevant site process parameters.

Specific Outcome 2: Prepare to manufacture propellants.

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.

2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.

2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Manufacture propellants.

Assessment Criteria:

3.1 Propellant equipment is started, operated and controlled according to standard operating procedures.

3.2 Materials are fed at the required rate and quantity as per standard operating procedures.

3.3 Product and process parameters are controlled and recorded according to standard operating procedures.

3.4 Samples are taken according to standard operating procedures and requirements.

3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of propellant manufacturing procedures.

Assessment Criteria:

4.1 Materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.

4.2 Materials or products are stored according to standard operating procedures.

4.3 Equipment is shut down according to standard operating procedures.

4.4 Sub-standard product is handled according to standard operating procedures.

4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.

4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.

4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.
4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	40 h
Recommended time spent in structured learning in the workplace and assessment	60h
Total notional hours	100h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

Operate initiating device manufacturing equipment in an explosive manufacturing environment

NLRD ID:

NQF Level: 2

Credits: 10

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in an explosive manufacturing environment who has the responsibility of operating initiating device manufacturing equipment in order to produce electronic, electric and non-electric initiating devices.

A person credited with this unit standard is able to:
- Demonstrate knowledge of initiating device manufacturing,
- Prepare to manufacture initiating devices,
- Manufacture initiating devices,
- Perform end of initiating device manufacturing procedures.

Range: Initiating device manufacturing refers to manufacturing of electronic, electric and non-electric initiating devices and may include soldering, moulding, spiking, crimping, RTT and Venus assembly line operations.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system ABET level 3
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.
- Hazardous materials and explosive materials properties and characteristics

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of initiating device manufacturing.
Assessment Criteria:
1.1 The facility, equipment and utilities in an initiating device plant are identified according to purpose, function and position in the plant or process.
1.2 The operating principles of equipment in the initiating device plant are described according to standard operating principles.
1.3 Property changes of the materials used in the initiating device manufacturing process are identified according to the materials' characteristics.

1.4 The movement of raw material through the initiating device plant is identified according to relevant site process parameters.

Specific Outcome 2: Prepare to manufacture initiating devices.

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.

2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.

2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Manufacture initiating devices.

Assessment Criteria:

3.1 Initiating device manufacturing equipment is started, operated and controlled according to standard operating procedures.

3.2 Materials are fed at the required rate and quantity as per standard operating procedures.

3.3 Product and process parameters are controlled and recorded according to standard operating procedures.

3.4 Samples are taken according to standard operating procedures and requirements.

3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of initiating device manufacturing procedures.

Assessment Criteria:

4.1 Materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.

4.2 Materials or products are stored according to standard operating procedures.

4.3 Equipment is shut down according to standard operating procedures.

4.4 Sub-standard product is handled according to standard operating procedures.

4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.

4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.

4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.

4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	40 h
Recommended time spent in structured learning in the workplace and assessment	60h
Total notional hours	100h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Decontaminate equipment and work areas in an explosive environment**

NLRD ID:

NQF Level: 2

Credits: 5

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in the explosive manufacturing environment where hazardous and explosive materials are handled. Knowledge regarding properties, behaviour, performance, safety requirements, identification of hazardous materials in explosive material manufacturing environment is essential for safe and effective cleaning and decontaminating of hazardous or explosives materials.

A person credited with this unit standard is able to:

- Demonstrate an understating of cleaning and decontaminating processes during explosive material spillages.
- Prepare to clean and decontaminate work areas exposed to explosive material spillages,
- Clean and decontaminate work areas exposed to explosive material spillages,
- Perform end of clean-up and decontaminating procedures.

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

LEARNING ASSUMED TO BE IN PLACE:

Description of required skills, knowledge and understanding on:

- The behaviour, performance and uses of explosives and chemicals.
- Handle and use explosive materials manually
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Demonstrate an understating of cleaning and decontaminating processes during explosive material spillages.

Range: Explosives materials include all types of explosives in a solid state or dissolved in a solvent. Explosive materials also include non-explosives material like paper, wood etc contaminated by explosives.

Assessment Criteria:

1.1 The importance of cleaning and decontaminating explosive manufacturing equipment and surfaces is explained by referring to occupational health specifications.

1.2 The effects of failing to remove explosive residues from explosive manufacturing equipment and surfaces before further utilisation are explained.

1.3 The types of cleaning and decontaminating agents used for the specific explosive manufacturing equipment and surfaces are identified and its purpose and working principles are explained according to chemical principles.

1.4 The factors that influence the efficiency of a cleaning agent are explained according to standard chemical principles.

1.5 The steps in the cleaning and decontaminating process, with the parameters of each, are identified according to standard operating procedures.

Specific Outcome 2: Prepare to clean and decontaminate work areas exposed to explosive material spillages,

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 Appropriate protective equipment and warning signs are prepared according to standard operating procedures.

2.3 Cleaning and decontaminating agents and cleaning equipment are prepared and handled according to standard operating procedures.

2.4 Manufacturing equipment and surfaces are prepared for cleaning and decontaminating according to standard operating procedures.

2.5 Site and organisation specific documentation is prepared according to standard operating procedures.

Specific Outcome 3: Clean and decontaminate work areas exposed to explosive material spillages.

Assessment Criteria:

3.1 The equipment and surfaces are cleaned and decontaminated according to standard operating procedures.

3.2 The cleaning and decontaminating agents are used in accordance with standard operating procedures, prescribed manufacturer's procedures and safety requirements.

3.3 The cleaned and decontaminated equipment and surfaces meet site-specific and legal requirements regarding deposits.

3.4 Problems during cleaning and sanitising decontaminating processes are identified and solved within the scope of work.

3.5 Residue is inspected according to standard operating procedure

Specific Outcome 4: Perform end of clean-up and decontaminating procedures

Assessment Criteria:

4.1 Waste is disposed of according to standard operating procedures.

4.2 Cleaning and decontaminating agents are stored according to standard operating procedures.

4.3 The work area is left in accordance with standard operating procedures and requirements.

4.4 Documents are completed and signed according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because the process is moderate in range, established and familiar and offers clear choices of routine responses. The learning demand employs basic operational knowledge and readily available information. The application of this unit standard is to qualify the person for certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	10 h
Recommended time spent in structured learning in the workplace and assessment	30h
Total notional hours	50h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure environment safety.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:
- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Operate hydraulic and pneumatic presses in an explosive manufacturing environment**

NLRD ID:

NQF Level: 2

Credits: 6

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is for people who manufacture or intend to manufacture explosive or pyrotechnic devices by pressing. The materials used could be hazardous or non-hazardous and the process could be wet or dry. The end product will always be hazardous.

A person credited with this unit standard is able to:
- Demonstrate knowledge of the hydraulic and pneumatic pressing process,
- Prepare to press,
- Manufacture explosive devices by pressing,
- Perform end of pressing procedures.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Solving of problems involving measurement, volume and time
- Read and respond to a range of text types.
- Apply sampling theory and practice in the chemical industry
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of the hydraulic and pneumatic pressing process.

Assessment Criteria:
1.1 The facility and equipment are identified according to purpose, function and position in the plant or process.
1.2 The operating principles of equipment in the hydraulic and pneumatic pressing are described according to standard operating principles.
1.3 Property changes of the materials used in the hydraulic and pneumatic pressing are identified according to the materials' characteristics.

Specific Outcome 2: Prepare to press.

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.

2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.

2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Manufacture explosive devices by pressing.

Assessment Criteria:

3.1 Hydraulic and pneumatic presses are started, operated and controlled according to standard operating procedures.

3.2 Explosive or pyrotechnic materials are fed at the required rate and quantity as per standard operating procedures.

3.3 Product and process parameters are controlled and recorded according to standard operating procedures.

3.4 Samples are taken according to standard operating procedures and requirements.

3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of pressing procedures.

Assessment Criteria:

4.1 Presses materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.

4.2 Materials or products are stored according to standard operating procedures.

4.3 Equipment is shut down according to standard operating procedures.

4.4 Sub-standard product is handled according to standard operating procedures.

4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.

4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.

4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.

4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	40h
Total notional hours	60h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-fieid outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Prepare and treat metal surfaces of empty containers or components in the manufacturing environment**

NLRD ID:

NQF Level: 2

Credits: 6

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is for people who need to prepare and treat the surfaces of empty container and components in a manufacturing plant or paint shop.

A person credited with this unit standard is able to:
- Demonstrate understanding of the treatment procedures of empty container and components surfaces,
- Prepare to surface treat empty containers or components,
- Surface treat empty containers or components,
- Perform end of surface treatment procedures.

Range: Metal surface treatments of containers or components in the manufacturing industry may include degreasing, cleaning, phosphating, de-rusting, gun coating, shot blasting and coating such as lacquer or varnishing.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Solving of problems involving measurement, volume and time
- Read and respond to a range of text types.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate understanding of the treatment procedures of empty container and components surfaces,

Assessment Criteria:
1.1 The specific surface treatment process is identified according to purpose and functionality during surface treatments in the manufacturing industry.
1.2 The chemical batch make-up, sampling procedures and chemical control are identified and explained according to standard operating procedures.
1.3 Chemical treatment baths, their purposes and uses are identified and according to site specific uses and applications.

1.4 Application methods to different component or container surfaces are identified according to applications methods and drawing requirements.

Specific Outcome 2: Prepare to surface treat empty containers or components.
Assessment Criteria:
2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.
2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.
2.3 The chemicals or other treatment materials is received, checked and maintained according to standard operating procedures.
2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.
2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Surface treat empty containers or components.

Assessment Criteria:
3.1 Surface treatment procedures are controlled according to standard operating procedures.
3.2 Process parameters are controlled and recorded according to standard operating procedures.
3.3 Containers or components are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.4 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of surface treatment procedures.

Assessment Criteria:
4.1 Containers or components are stored according to standard operating procedures.
4.2 Sub-standard product is handled according to standard operating procedures.
4.3 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.
4.4 Cleaning equipment and materials are stored in designated areas according to work-site requirements.
4.5 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.
4.6 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.

- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The level assigned to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	40h
Total notional hours	60h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:
- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973

- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Operate a milling or grinding machine in the manufacturing environment**

NLRD ID:

NQF Level: 1

Credits: 5

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in a manufacturing environment who has the responsibility of operating a milling or grinding machine during a batch or continuous process in order to produce material of the required quality and size as determined by the standard operating procedures.

A person credited with this unit standard is able to:
- Demonstrate knowledge of the milling/grinding plant/process,
- Prepare to mill/grind material,
- Mill/grind a material,
- Perform end of milling/grinding and packaging procedures.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system ABET level 3
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of the milling/grinding plant/process

Assessment Criteria:
1.1 The facility, equipment and utilities in a milling/grinding plant or process are identified according to purpose, function and position in the plant or process.
Range: Equipment may refer to pumps, vessels, filters, hoppers, milling/grinding equipment, temperature indicators, pressure indicators and fans.
1.2 The operating principles of equipment in the milling/grinding plant/process are described according to standard operating principles.
1.3 Property changes of the materials used in the milling/grinding process are identified according to the materials' characteristics.
1.4 The movement of raw material through the milling/grinding plant/process are identified according to relevant site process parameters.

Range: Process parameters may refer to temperature, pressure, humidity, hoppers and equipment settings.

Specific Outcome 2: Prepare to mill/grind material

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.

2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.

2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Mill/grind material

Assessment Criteria:

3.1 Milling/grinding equipment is started, operated and controlled according to standard operating procedures.

3.2 Materials are fed at the required rate and quantity as per standard operating procedures.

3.3 Product and process parameters are controlled and recorded according to standard operating procedures.
Range: Parameters may refer to feed rate, temperature, humidity, pressure, classifier speed, filter, herringbone sieve setting, dust extraction speed, nozzle size, and grinding/milling rate/speed settings.

3.4 Samples are taken according to standard operating procedures and requirements.

3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of milling/grinding and packaging procedures.

Assessment Criteria:

4.1 Milled/grinded materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.

4.2 Materials or products are stored according to standard operating procedures.

4.3 Equipment is shut down according to standard operating procedures.

4.4 Sub-standard product is handled according to standard operating procedures.

4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.

4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.

4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.

4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	30h
Total notional hours	50h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Transport and store explosives and explosive containing materials**

NLRD ID:

NQF Level: 2

Credits: 6

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE STATEMENT:

This unit standard is intended for a person who works in an explosive material manufacturing unit and who has the responsibility to package, transport and store explosive containing items and devices in an explosive manufacturing environment.

A person credited with this unit standard is able to:
- prepare for explosive material packaging, transporting and storing,
- package, transport and store explosive containing items and devices,
- perform end of packaging, transporting and storing procedures.

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

Learning assumed to be in place
Description of required skills, knowledge and understanding on:
- Understand and use the number system
- Understand of appropriate measures and the relationships between different units of measure.
- Solving of problems involving measurement, volume and time
- Read and respond to a range of text types.
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Prepare for explosive material packaging, transporting and storing.

Assessment Criteria:
1.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure hygiene and personal and product safety.
1.2 The work area, equipment and materials are prepared according to standard operating procedures.
1.3 Preparation-related problems are solved within scope of work and according to standard operating procedures.

Specific Outcome 2: Package, transport and store explosive containing items and devices.
Assessment Criteria:

2.1 Explosive containing items and devices are packaged, transported and stored according to standard operating procedures.
2.2 The packaging, transporting equipment is handled and controlled according to standard operating procedures.
2.3 The packaging, transporting and storing parameters are controlled and recorded according to standard operating procures.
2.4 Documents are completed and handled according to standard operating procedures.
2.5 Explosive containing items and devices are released for further handling or storing according to standard operating procedures.
2.6 Explosive containing items and devices are delivered to the allocated area according to standard operating procedures.
2.7 Work areas are kept and maintained during the receiving procedures according to standard operating procedures.

Specific Outcome 3: Perform end of packaging, transporting and storing procedures.
Assessment Criteria:

3.1 The packaging, transporting equipment is shut down according to standard operating procedures.
3.2 Sub-standard materials are handled according to standard operating procedures.
3.3 The work area and receiving equipment are cleaned according to standard operating procedures.
3.4 Cleaning equipment is stored in designated areas and according to work-site requirements.
3.5 Waste from the cleaning process is handled and stored or dispatched according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because the process is moderate in range, established and familiar and offers clear choices of routine responses. The learning demand employs basic operational knowledge and readily available information. The application of this unit standard is to qualify the person for certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	40h
Total notional hours	60h

NOTES:

Critical cross-field outcomes
The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Identifying and solving problems during preparation for pre-batching and mixing of raw materials or ingredients within the scope of work.

2. Work effectively with others as a member of a team, group, organisation or community by:

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information during packaging, storing and transporting of explosive containing items and devices.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Use science and technology effectively and critically, showing responsibility towards the environment and health of others by.
   - Complying with safety and workplace procedures.

7. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:
- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refer to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Operate initiating device manufacturing equipment in an explosive manufacturing environment**

NLRD ID.:

NQF Level: 2

Credits: 10

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in an explosive manufacturing environment who has the responsibility of operating initiating device manufacturing equipment in order to produce electronic, electric and non-electric initiating devices.

A person credited with this unit standard is able to:
- Demonstrate knowledge of initiating device manufacturing,
- Prepare to manufacture initiating devices,
- Manufacture initiating devices,
- Perform end of initiating device manufacturing procedures.

Range: Initiating device manufacturing refers to manufacturing of electronic, electric and non-electric initiating devices and may include soldering, moulding, spiking, crimping, RTT and Venus assembly line operations.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system ABET level 3
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.
- Hazardous materials and explosive materials properties and characteristics

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of initiating device manufacturing.
Assessment Criteria:
1.1 The facility, equipment and utilities in an initiating device plant are identified according to purpose, function and position in the plant or process.
1.2 The operating principles of equipment in the initiating device plant are described according to standard operating principles.
1.3 Property changes of the materials used in the initiating device manufacturing process are identified according to the materials' characteristics.

1.4 The movement of raw material through the initiating device plant are identified according to relevant site process parameters.

Specific Outcome 2: Prepare to manufacture initiating devices.

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.

2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.

2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Manufacture initiating devices.

Assessment Criteria:

3.1 Initiating device manufacturing equipment is started, operated and controlled according to standard operating procedures.

3.2 Materials are fed at the required rate and quantity as per standard operating procedures.

3.3 Product and process parameters are controlled and recorded according to standard operating procedures.

3.4 Samples are taken according to standard operating procedures and requirements.

3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of initiating device manufacturing procedures.

Assessment Criteria:

4.1 Materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.

4.2 Materials or products are stored according to standard operating procedures.

4.3 Equipment is shut down according to standard operating procedures.

4.4 Sub-standard product is handled according to standard operating procedures.

4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.

4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.

4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.

4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	40 h
Recommended time spent in structured learning in the workplace and assessment	60h
Total notional hours	100h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Mix explosive and non-explosive materials**

NLRD ID:

NQF Level: 2

Credits: 6

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE STATEMENT:

This unit standard is intended for a person who works in an explosive material manufacturing unit and who has the responsibility to pre-batch and mix raw materials for explosive product manufacturing.

A person credited with this unit standard is able to:
- demonstrate an understanding regarding the mixing procedure,
- prepare for mixing of raw materials,
- mix or blend components,
- perform end mixing procedures.

Range: Pre-mixing procedures may refer to screening, drying, weighing and sampling. Explosive materials refer to all types of explosive materials including primary, secondary explosives and pyrotechnic compositions.

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

Learning assumed to be in place
Description of required skills, knowledge and understanding on:
- Understand and use the number system
- Understand of appropriate measures and the relationships between different units of measure.
- Solving of problems involving measurement, volume and time
- Read and respond to a range of text types.
- Apply sampling theory and practice in the chemical industry
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate an understanding regarding the mixing procedure

Assessment Criteria:

1.1 The importance of mixing as part of the production process is explained according to mixing principles.

1.2 The importance of the correct mass and volume of the raw materials in terms of the final quality of the product, are explained according to standard operating procedures.

1.3 The working principles and procedures of the weighing equipment are described according to standard operating procedures.

1.4 The purpose of mixing raw materials in product formulation is explained in terms of legal requirements, consistency of product composition and profitability of production.

1.5 The functions of the raw materials used in the formulation of the product are identified according to standard operating procedures.

1.6 The importance of following the mixing procedure of raw materials according to standard operating procedures is explained.
Range: Mixing procedure refers to:
- Correct quantities of raw materials,
- Specific sequence during weighing, screening and mixing
- Correct mixing rate,
- Importance of temperature during mixing.

1.7 The reasons for mixing raw materials before further processing are explained according standard manufacturing principles.

1.8 Safety practices and procedures for mixing of raw materials are identified according to standard operating procedures.

Specific Outcome 2: Prepare for mixing of raw materials.

Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure hygiene and personal and product safety.

2.2 Equipment and procedures are selected according to characteristics of the explosive materials.

2.3 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning and pre-start up checks on the equipment.

2.4 The raw materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to sufficient quantity and checking if the raw materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the raw materials.

2.5 Containers and/or wrappings used for mixing raw materials are prepared according to standard operating procedures.

2.6 Raw material shortages are reported according to standard operating procedures.
Problems during preparation for mixing are identified and solved within the scope of work.

2.6 Work-site documents are correctly interpreted according to standard operating procedures.

Specific Outcome 3: Mix or blend components

Assessment Criteria:

3.1 Raw materials are weighed and measured according to standard operating procedures.

3.2 Weights and/or volumes of raw materials are recorded according to standard operating procedures.

3.3 Raw materials are released for further processing according to standard operating procedures.

Range: Releasing of raw materials can only take place if:

- any other process-related problems are solved within scope of work in order to ensure product quality,
- adjustments are made to the process when it does not meet the work-site requirements.

3.4 Mixing equipment is operated according to standard operating procedures.

3.5 Mixing of raw materials during product formulation is carried out according to standard operating procedures.

3.6 A representative sample is taken for quality control purposes according to standard operating procedures.

3.7 The mixing process is monitored and controlled according to standard operating procedures.

3.8 Work areas are kept and maintained during mixing according to standard operating procedures

Specific Outcome 4: Perform end of mixing and mixing procedures.

Assessment Criteria:

4.1 Equipment and work area are shut-down, cleaned and maintained according to standard operating procedures.

4.2 Unused raw materials are distributed to the correct designation according to standard operating procedures.

4.3 Mixing documentation is completed according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because the process is moderate in range, established and familiar and offers clear choices of routine responses. The learning demand employs basic operational knowledge and readily available information. The application of this unit standard is to qualify the person for certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	40h
Total notional hours	60h

NOTES:

Critical cross-field outcomes
The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Identifying and solving problems during preparation for mixing and mixing of raw materials within the scope of work.

2. Work effectively with others as a member of a team, group, organisation or community by:
   - Preparing for mixing of raw materials,
   - Performing end-of-process duties,

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Taking a representative sample for quality control purposes according to standard operating procedures,
   - Monitoring and controlling the mixing process.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Use science and technology effectively and critically, showing responsibility towards the environment and health of others by.
   - Complying with safety and workplace procedures.

7. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:
- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

Title: **Control waste or effluent water in a manufacturing environment**

NLRD ID:

NQF Level: 2

Credits: 4

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is for persons working in all sectors of manufacturing and assembly related industries using water in the workplace. This unit standard will contribute towards the achievement of a work-related skill in the area of pollution prevention and environmental management.

A person credited with this unit standard is able to:
- Demonstrate understanding of wastewater/sewage and storm water systems,
- Apply basic water pollution prevention practices,
- Maintain good trade effluent control practices,
- Maintain good hygiene and housekeeping practices.

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

LEARNING ASSUMED TO BE IN PLACE:

Description of required skills, knowledge and understanding on:
- Understand and use the number system, ABET level 3.
- Read and respond to a range of text types, ABET level 3.
- Demonstrate an understanding of occupational health, safety and environmental legislation relevant to the explosion manufacturing environment.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Demonstrate understanding of wastewater/sewage and storm water systems

Assessment Criteria:

1.1 The use of water in industry is explained and the problems associated with industrial waste water discussed according to applicable environment legislation.

1.2 Wastewater/sewage and storm water systems are identified and the consequences of interconnections explained with regard to the impact on health and environment.

1.3 Pre- treatment of effluent is discussed and reference made to consequences of releasing highly polluted water into the Local Authority's systems.

1.4 External sources of water supply and internal drainage systems are identified, and the differences between these explained in terms of effective effluent control practices.

Specific Outcome 2: Apply basic water pollution prevention practices.
Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 Appropriate protective equipment and warning signs are prepared according to standard operating procedures.

2.3 Process effluent is handled according to standard operating procedures.
Range Disposal includes at least one, but not limited to, the following methods: absorbent materials; bins; sand, oil and grease traps or SKIPS

2.4 Polluted water is monitored and the correctly disposed of to ensure that sewage and storm water systems are not contaminated according to standard operating procedures.

2.5 The company's internal effluent system is described with reference to pollutants and problems relevant to different effluents.

2.6 Implications of not conforming to legislation and the Local Authority by-laws are explained in terms of impact on the environment, the operator and the company.

Specific Outcome 3: Maintain good effluent control practices
Assessment Criteria:

3.1 Effluent pipes are connected and disconnected with minimum spillage and due regard for health, hygiene, safety and environment according to standard operating procedures.

3.2 Effluent mechanisms, demarcated areas and bund walls are pre-treated and maintained according to standard operating procedures.
Range: Pre treatment refers to inspection, clearing of debris or reporting.
Effluent mechanisms refer to sand, oil and grease traps and other pre-treatment of effluent mechanisms.

3.3 Spillages are disposed of in a way that meets with environmental policies and standard operating procedures.

3.4 Process records are kept according to standard operating procedures.

Specific Outcome 4: Maintain good hygiene and housekeeping practices when using industrial water.
Assessment Criteria:

4.1 Good housekeeping standards are maintained according to standard operating procedures.

4.2 The work environment maintained according to according to standard operating procedures.
Range: Maintaining of work environment may refer to cleanliness, free from debris and hazards. Sources of dirt and/or contamination are identified and removed

4.3 Team members describe their housekeeping and spill control responsibilities according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.

- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	20h
Total notional hours	40h

NOTES:

Critical cross-field outcomes
The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes.

- Basic content of appropriate legislation, by-laws and Company policies
- Understanding of the functions of various wastewater/sewage disposal systems
- Understanding of the functions of the factory's own effluent system
- Health, hygiene and basic safety issues relating to wastewater/sewage

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

TITLE: **Operate small arms ammunition manufacturing equipment**

NLRD ID:

NQF Level: 2

Credits: 10

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in an explosive manufacturing environment who has the responsibility of operating the small arms ammunition manufacturing equipment.

A person credited with this unit standard is able to:
- Demonstrate knowledge of the small arms ammunition manufacturing,
- Prepare to manufacture small arms ammunition,
- Manufacture small arms ammunition,
- Perform end of small arms ammunition manufacturing procedures.

Range: Small arms ammunition manufacturing refers to capping, cartridge loading and loading operations.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system ABET level 3
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.
- Hazardous materials and explosive materials properties and characteristics
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate knowledge of the small arms ammunition manufacturing.
Assessment Criteria:
1.1 The facility, equipment and utilities in a small arms ammunition plant are identified according to purpose, function and position in the plant or process.
1.2 The operating principles of equipment in the small arms ammunition plant are described according to standard operating principles.
1.3 Property changes of the materials used in the small arms ammunition manufacturing process are identified according to the materials' characteristics.

The movement of empty components, explosives and components containing explosives through the small arms ammunition plant are identified according to relevant site process parameters.

Specific Outcome 2: Prepare to manufacture small arms ammunition.
Assessment Criteria:

2.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.

2.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

2.3 The materials is received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the materials.

2.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.

2.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 3: Manufacture small arms ammunition.
Assessment Criteria:

3.1 Small arms ammunition equipment is started, operated and controlled according to standard operating procedures.

3.2 Materials are fed at the required rate and quantity as per standard operating procedures.

3.3 Product and process parameters are controlled and recorded according to standard operating procedures.

3.4 Samples are taken according to standard operating procedures and requirements.

3.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

3.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 4: Perform end of small arms ammunition manufacturing procedures.

Assessment Criteria:

4.1 Materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.

4.2 Materials or products are stored according to standard operating procedures.

4.3 Equipment is shut down according to standard operating procedures.

4.4 Sub-standard product is handled according to standard operating procedures.

4.5 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.

4.6 Cleaning equipment and materials are stored in designated areas according to work-site requirements.

4.7 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.

4.8 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	40 h
Recommended time spent in structured learning in the workplace and assessment	60h
Total notional hours	100h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Operate an industrial vibrating screening and/or sieving facility in a manufacturing environment**

NLRD ID:

NQF Level: 1

Credits: 5

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works in a manufacturing environment who has the responsibility of operating an industrial vibrating screening and/or sieving facility in order to produce screened and/or sieved material according to standard operating procedures.

A person credited with this unit standard is able to:
- Prepare to screen and/or sieve dry materials,
- Screen and/or sieve dry materials,
- Batch and label substance and/or products,
- Perform end of screening and/or sieving and packaging procedures.

Range: The materials used during the screening and/or sieving may refer to dry hazardous or non-hazardous materials. During the handling and screening/sieving of hazardous material the necessary personal and environment safety procedures should be adhered to.
Batch sizes may vary from 500 g to 500kg.

This unit will contribute to the full development of the learner within the field of manufacturing by providing recognition, further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- Understand and use the number system, ABET level 3.
- Understand of appropriate measures and the relationships between different units of measure.
- Read and respond to a range of text types, ABET level 3.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Prepare to screen and/or sieve dry materials.

Assessment Criteria:
1.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.
1.2 The work environment and equipment are prepared according to standard operating procedures.
Range: Preparation refers to cleaning, pre-start up checks and settings on the equipment.

1.3 The raw materials received, checked and maintained according to standard operating procedures.
Range: Receiving refers to correct batch number, sufficient quantity, substance and checking if the raw materials are quality released according to work-site requirements. Maintaining refers to all the work-site requirements in order to maintain the quality of the raw materials.
1.4 Consequences of inadequate preparation are described in terms of the effect on the quality of the product, productivity and safety.
1.5 Documentation is completed to ensure correct inventory and process/product history according to standard operating procedures.

Specific Outcome 2: Screen and/or sieve dry materials.

Assessment Criteria:
2.1 Manufacturing equipment is started, operated and controlled according to standard operating procedures.
2.2 Materials are fed at the required rate and quantity as per standard operating procedures.
2.3 Product and process parameters are controlled and recorded according to standard operating procedures.
2.4 Samples are taken according to standard operating procedures and requirements.
2.5 Materials or products are released for further processing according to standard operating procedures.
Range: Releasing of materials or products can only take place if:
- o any other process-related problems are solved within scope of work in order to ensure product quality,
- o adjustments are made to the process when it does not meet the work-site requirements.

2.6 Work areas are kept and maintained according to standard operating procedures.

Specific Outcome 3: Batch and label substance and/or products

Assessment criteria:
3.1 Screened and/or sieved materials are weighed, packed and labelled as per operating procedures.
Range: Labelling refer to batch number, weight, type of material.
3.2 Documentation is correctly completed and submitted for inventory purposes according to standard operating procedures.
3.3 Materials or products are stored according to standard operating procedures.

Specific outcome 4: Perform end of screening and/or sieving and packaging procedures.

Assessment Criteria:
4.1 Equipment is shut down according to standard operating procedures.
4.2 Sub-standard product is handled according to standard operating procedures.
4.3 The work area and equipment are cleaned and/or decontaminated according to standard operating procedures.
4.4 Cleaning equipment and materials are stored in designated areas according to work-site requirements.
4.5 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.
4.6 Process records are kept according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.

- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	30h
Total notional hours	50h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Explosive environment:

- Knowledge of emergency evacuation procedures, colour codes, pictograms and kinetic handling.

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Apply occupational health, safety and environmental protection in an explosive manufacturing environment**

NLRD ID:

NQF Level: 2

Credits: 8

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person working in an explosive manufacturing environment who needs to be aware of the current and applicable legislation relevant to the industry he/ she is working in while engaging in personal, workplace and environmental safety procedures and actions.

A person credited with this unit standard is able to:
- demonstrate an understanding of personal health, safety and environmental protection as applied in an explosive manufacturing environment
- demonstrate an understanding of safe working practices in an explosive manufacturing environment.
- deal safely with emergencies

This unit will contribute to the full development of the learner with in the explosive manufacturing environment by providing recognition, further mobility and transportability within the field of manufacturing and assembly. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing and technology context.

LEARNING ASSUMED TO BE IN PLACE:
Description of required skills, knowledge and understanding on:
- good housekeeping practices in the work environment.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA

Specific Outcome 1: Demonstrate an understanding of personal health, safety and environmental protection as applied in an explosive manufacturing environment

Assessment Criteria:
1.1 The purpose of safety, health and environmental legislation in the workplace is explained according to the applicable legislation.
1.2 The employers and employee's rights and responsibilities regarding safety in the work place are explained in terms of the Occupational Health and Safety Act.
1.3 Safety signs and symbols in an explosive manufacturing environment are identified and its purpose explained in compliance with explosive manufacturing environment safety regulations and the Occupational Health and Safety Act.
1.4 The importance of personal protective clothing and safety gear is explained according to safety requirements.

1.5 Colour codes on pipelines are identified and the purpose of each is explained in compliance with explosive factory safety regulations and the Occupational Health and Safety Act.

Specific Outcome 2: Demonstrate an understanding of safe working practices in an explosive manufacturing environment.

Assessment Criteria:

2.1 Personal protective clothing and safety gear are identified and its purpose explained according to site-specific safety requirements.
Range: Personal protective clothing and safety gear refer to static free clothing, cotton underwear, conductive shoes and copper armband earthed to the ground

2.2 Handling and lifting techniques of heavy objects are demonstrated according to personal safety principles.

2.3 Personal safety practices regarding workplace and manufacturing equipment within scope of work are identified according to standard operating procedures.

2.4 The work environment and manufacturing equipment is prepared and maintained according to standard operating safety requirements.
Range: Safety in the work environment and manufacturing equipment may refer to remote controlled operations and shatter proof glass shutters/windows

2.5 Safety precautions and practices during good housekeeping, personal safety actions and health and hygiene practices in an explosive manufacturing environment are identified and described according to standard operating procedures and site-specific safety regulations.

Specific Outcome 3: Deal with emergencies safely
Range: Safety emergencies refer to personal safety, equipment and plant safety.

Assessment Criteria:

3.1 Safety emergency situations within his/her scope of work and working environment are identified.
Range: Safety emergency situations refer to fire prevention and evacuation, application of first aid, personal safety actions (where human safety is endangered), environment spillages and good housekeeping.

3.2 The purpose and responsibilities of a safety and emergency representative are explained according to Occupational Health and safety Act.

3.3 The procedures for reporting emergencies to the emergency officer are identified and described according to standard operating procedures.
Range: The explanation includes situations where human safety is endangered, first aid is needed fire or explosion breaks out.

3.4 Safety precautions and practices during good housekeeping, personal safety actions and health and hygiene practices in an explosive manufacturing environment are identified and described according to standard operating procedures.
Range: Safety precautions and practices may refer to stopping procedures after spillages or explosions.

3.5 Personal and equipment safety procedures during an emergency situation are explained within his/her scope of work.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.

- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	60h
Total notional hours	80h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be ? are applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Destroy hazardous waste or redundant explosives**

NLRD ID:

NQF Level: 2

Credits: 6

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works or wants to start a career in the explosive manufacturing environment where hazardous materials would be handled. Knowledge regarding properties, behaviour, performance, safety requirements, identification and uses of hazardous materials in explosive material and ammunition manufacturing environment is essential for safe and effective destroying of hazardous or redundant explosives working conditions.

A person credited with this unit standard is able to:
- Prepare to destroy hazardous waste or redundant explosives,
- Destroy hazardous waste or redundant explosives,
- Clean-up the environment after destruction of hazardous waste or explosive material.

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

LEARNING ASSUMED TO BE IN PLACE:

Description of required skills, knowledge and understanding on:
- The behaviour, performance and uses of explosives.
- Handle and use explosive materials manually
- Understanding of the behaviour, performance and uses of explosives
- Understanding of occupational health, safety and environment legislation relevant to the explosive manufacturing environment

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Prepare to destroy hazardous waste or redundant explosives.
Range: Explosives materials include all types of explosives in a solid state or dissolved in a solvent. Explosive materials also include non-explosives material like paper, wood etc contaminated by explosives.
Assessment Criteria:
1.1 Personal preparation is done according to standard operating procedures.

Range: Personal preparation refers to practices that ensure personal, product and environment safety.

1.2 Appropriate protective equipment and warning signs are prepared according to standard operating procedures.

1.3 Evacuation and safety process for all personnel is followed according to standard operating procedures.

1.4 Destruction facility, resources and materials are prepared according to standard operating procedures.

1.5 Site and organisation specific documentation is prepared according to standard operating procedures.

Specific Outcome 2: Destroy hazardous waste or redundant explosives

Assessment Criteria:

2.1 Explosives materials or hazardous waste are sorted according to standard operating procedures.

2.2 Documentation is reconciled with actual material to be destroyed according to standard operating procedures.

2.3 Any anomalies are reported according to standard operating procedures.

2.4 Waste is prepared for destruction and placed in destruction area according to standard operating procedures.

2.5 Initiation system is placed and applied according to standard operating procedures.

Specific Outcome 3: Treat residue after destruction

Assessment Criteria:

3.1 Treatment procedures are carried out according to standard operating procedures.

3.2 Tools, equipment and protective are used according to standard operating procedures.

3.3 Residue is inspected according to standard operating procedure.

3.4 Documentation is completed to reflect history of the process according to standard operating procedures.

Specific Outcome 4: Clean-up the environment after destruction of hazardous waste or explosive material

Assessment Criteria:

4.1 Cleaning is completed according to standard operating procedures.

4.2 Sampling is carried according to standard operating procedures.

4.3 Tools are removed and stored according to standard operating procedures.

4.4 Documents are completed and signed according to standard operating procedures.

4.5 Ash is removed and stored or treated according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.

- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because the process is moderate in range, established and familiar and offers clear choices of routine responses. The learning demand employs basic operational knowledge and readily available information. The application of this unit standard is to qualify the person for certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	30 h
Recommended time spent in structured learning in the workplace and assessment	30h
Total notional hours	60h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure environment safety.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:

- The Explosives Act and Regulations, Act 26 of 1956
- The Hazardous Substances Act and Regulations, Act 15 of 1973
- The Occupational Health and Safety Act, Act 85 of 1993. Regulations No 24272 of January 2003
- The Mine Health and Safety Act, Act 29 of 1996
- The Environmental Conservation Act, Act 73 of 1989
- ISO 9001 & 14000

Definition of terms within this unit standard:

Protective clothing/gear refers to clothing that safeguards the person and the product.

Standard operating procedures refer to company procedures, prescribed procedures from the manufacturer, personal, equipment and environmental safety procedures, good manufacturing practices, best practices, time frames, applicable legislation and specifications.

TITLE: **Handle explosive materials manually**

NLRD ID.:

NQF Level: 1

Credits: 5

Field: Manufacturing, Engineering and Technology

Sub- Field: Manufacturing and Assembly

Issue Date:

Review Date:

PURPOSE:

This unit standard is intended for a person who works or wants to start a career in the explosive manufacturing environment where hazardous materials would be handled. Knowledge on terminology, properties, safety requirements, identification and handling techniques of hazardous materials in an explosive materials and ammunition manufacturing environment is essential for safe and effective working conditions.

A person credited with this unit standard is able to:
- Demonstrate an understanding on explosive materials,
- Demonstrate an understanding of detonation and deflagration,
- Handle explosives in the manufacturing environment.

This unit will contribute to the full development and further mobility and transportability within the fields of manufacturing and technology. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and progression within the manufacturing context where hazardous materials are being handled.

LEARNING ASSUMED TO BE IN PLACE

Description of required skills, knowledge and understanding on:
- Understand and use the number system, ABET level 3.
- Read and respond to a range of text types, ABET level 3.

SPECIFIC OUTCOMES AND ASSESSMENT CRITERIA:

Specific Outcome 1: Demonstrate an understanding explosive materials.

Assessment Criteria:

1.1 The properties of hazardous materials used in a manufacturing plant are listed and their reactions described with regards to their contribution to the production process.

1.2 The importance of protecting self, equipment, product and environment is explained, and the consequences of negligent on-site handling discussed in terms of standard operating procedures.

1.3 The consequences of misuse of hazardous materials in the work place and society at large are explained with reference of standard operating procedures.

1.4 The differences between high explosives and low explosives are described in terms of sensitivity to explosion.

1.5 The differences between primary and secondary high explosives are described in terms of their sensitivity to explosion.

1.6 The explosives manufactured or used in the working environment are classified in terms of its sensitivity to explosion.

Specific Outcome 2: Demonstrate an understanding of detonation and deflagration.
Assessment Criteria:

2.1 Detonation and deflagration as explosive reactions are recognised and explained according to basic explosive reactions.
2.2 Detonation as a typical process of high explosive reactions is explained according to basic explosive reactions.
2.3 Deflagration as a typical process of low explosives is explained according to basic explosive reactions.
2.4 Explosives manufactured or used in working environment which will detonate or deflagrate are identified according to site examples
2.5 The term velocity of detonation is explained using scientific principles.

Specific Outcome 3: Handle explosives in the manufacturing environment
Assessment Criteria:

3.1 Personal preparation is done according to standard operating procedures.
Range: Personal preparation refers to practices that ensure personal, product and environment safety.
3.2 The work environment and equipment are prepared according to standard operating procedures.
3.3 Explosives are handled according to standard operating procedures.
3.4 Spillages are removed using the appropriate method according to standard operating procedures.
3.5 Waste from the cleaning process is handled and stored or removed according to standard operating procedures.
3.6 Documentation is correctly completed and submitted for inventory purposes according to standard operating procedures.
3.7 Explosives are stored according to standard operating procedures.

ACCREDITATION AND MODERATION OPTIONS:

- Internal moderation.
- External moderation.
- An assessor, accredited by the relevant ETQA, will assess the learner's competency.
- Assessment procedures will be supplied by the ETQA in alignment with NSB requirements.
- All assessment activities must be fair, so that all candidates have equal opportunities. Activities must be free of gender, ethnic or other bias.
- Assessment and moderation procedures, activities and tools must be transparent, affordable and support development within the field, sub-field and NQF.
- Questions and answers to determine theoretical knowledge are expected.
- Examination of an assessment portfolio.
- Reporting skills are demonstrated by effective communication, using verbal (language) and/or writing skills.
- Direct observation in simulated or actual work conditions.

RANGE STATEMENTS:

The **level assigned** to this unit standard is appropriate because a narrow range of knowledge and cognitive skills is applied. The application of this unit standard is to qualify the person for entry into career-based certification.

The credit value assigned to this unit standard is appropriate and reflects the average length of time for an average qualifying learner to become competent.

Recommended contact time and individual learning	20 h
Recommended time spent in structured learning in the workplace and assessment	30h
Total notional hours	50h

NOTES:

Critical cross-field outcomes

The following critical outcomes are addressed in this unit standard

1. Identify and solve problems in which response displays that responsible decisions, using critical and creative thinking, have been made by:
   - Solving process related problems within the scope of work in order to ensure product quality.

2. Work effectively with others as a member of a team, group or organisation.

3. Organise and manage oneself and one's activities responsibly and effectively by:
   - Performing personal preparation, workplace and equipment preparation in order to operate process and equipment according to standard operating procedures.

4. Collect, analyse, organise and critically evaluate information by:
   - Analysing and interpreting manufacturing records and analysis.

5. Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
   - Verbal and non-verbal communication methods and keeping records.

6. Contribute to the full personal development of each learner and the social and economic development of the society at large.

Essential Embedded Knowledge:
Embedded knowledge is reflected within the assessment criteria of each specific outcome and critical cross-field outcomes

Supplementary Information:

Legal requirements:
The following acts and/or codes, current and future regulations and amendments may be applicable:
- The Explosives Act and Regulations, Act 26 of 1956
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Note to the providers:
Demonstrate the impact of velocity at a safe test range, for learners to fully understand and comprehend velocity.