

*This document, **Brunei Darussalam National Occupational Skills Standards Welding Level 3**, has been formally endorsed as of the following date by the members of the council.*

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1. INTRODUCTION TO BRUNEI DARUSSALAM NATIONAL OCCUPATIONAL SKILLS STANDARDS (BNOSS)

Brunei Darussalam National Occupational Skills Standards (BNOSS) is a document that underlines and specifies competencies needed by a skilled worker who is gainfully employed for an occupational area and level, and pathway to achieve the competencies.

A group of expert panels consisting of industrial experts and practitioners of a particular occupational sector need to be identified in developing the standard. With the involvement of these experts in the development of the BNOSS document, measurable benchmarks of skills and performance in the related area can be established in relation to the expectation of employers and the current requirements of the industry. These standards shall be aligned to the Brunei Darussalam Qualifications Framework (BDQF).

BNOSS is a set of standards of performance that an individual is required to achieve when carrying out effectively functions of a particular job. It is used as a reference for the industry, career path of a skilled worker, training purposes and benchmarks for best practices.

2. BENEFITS OF BNOSS

To the employers

- Able to describe the Job description and determine the salary.
- Employers can use the skills standards to establish personnel qualification requirements.
- Assess employee skill levels based on industry standard.
- Match employee skills to the work needed.
- Training gap analysis.
- To advertise job requirement to standards specification.

To the employees

- Able to understand employers expectation of workers competencies in terms of knowledge, skills and attitude towards the specific job scope.
- Able to determine the skills and abilities needed for advancement or transfer industries and determine the right credential needed to upgrade skills.
- Can use BNOSS as guideline to identify the career development pathway in order to succeed in their occupation.

To the training organisations

- BNOSS as a guideline for training organisations to develop their own curriculum.
- Able to develop assessment mechanism and specifications to assess trainees competencies.

- Able to build a cohesive relationship through a like-minded expectation of trainee's competencies and work readiness.
- Enhances the ability and confidence to train consistent with the industry's current expectations and needs.
- Develop new and evaluate existing curriculum and programs based on industry needs.

3. WELDING LEVEL 3

For Welding Level 3, a welder will acquire more advanced knowledge on welding of carbon steel piping, pipeline and structural materials up to 6GR combination welding of 2 common techniques TIG + stick welding, commonly in oil & gas industry. The welder will at least have awareness of using different metal cutting processes used in oil & gas (oxy fuel and plasma).

Other soft skill and leadership competent levels are also included as general requirements for all trades.

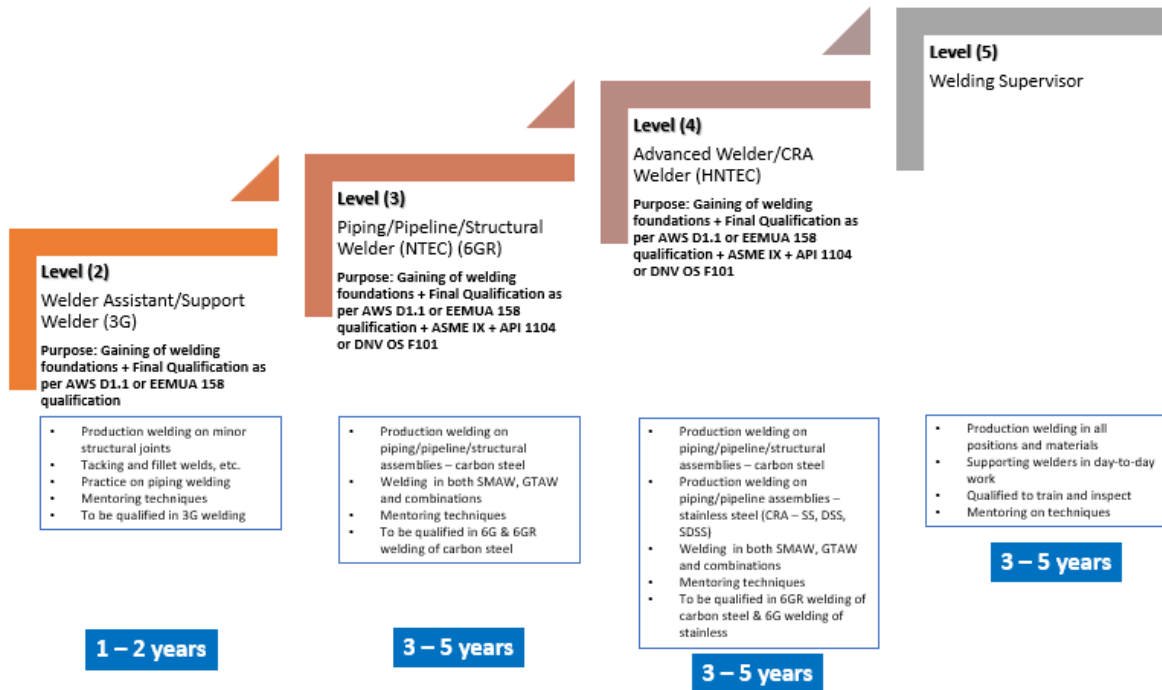
4. ENTRY REQUIREMENTS

The specific of the qualifications are not limited to the list provided:

- Must be 17 years' old and above;
- Completion of secondary education;
- Able to communicate in English both oral and written;
- Physically and medically fit as certified by a Medical Officer;
- Pass the eyesight and hearing test;
- Declaration of any disabilities.
- Pass the Welding Level 2 assessment.

5. COMPETENCY LEVEL, OCCUPATIONAL STRUCTURE AND CAREER PROGRESSION

SECTOR	Energy
SUB-SECTOR	Support services for petroleum and natural gas mining
OCCUPATION	Welder
LEVEL 5	Welding Supervisor
LEVEL 4	Advanced Welder/CRA Welder (HNTEC)
LEVEL 3	Piping/Pipeline/Structural Welder (6GR)
LEVEL 2	Welder Assistant/Support Welder (3G)
LEVEL 1	Welding Apprentice (2G)



6. AWARD OF CERTIFICATE

This section will guide the process of awarding certificate for every training course conducted by an approved training organisation to ensure the consistency. The guidelines are as follows:

6.1 Certificate of Competence

In order to award Certificate of Competence by an awarding body, Statement of Competence need to be issued by the training organisation after the completion of the course.

The statement of competence should include the following but is not limited to:

- Training organisation's name;
- Course title or competency assessment title;
- Candidate's name;
- Assessment date(s) and training date(s);
- Expiry date;
- Unique Certificate Number;
- Instructor's/Trainer's Name and Signature;
- Assessor's Name and Signature and
- Optional but not required
 - Training Organisation's managing director Name and Signature.

Training organisations are encouraged to inform all concerned including employers and candidates that such Certificates shall not be used as reference of a person's competency or aptitude.

Each certificate awarded to a successful candidate must indicate that the candidate has been assessed and has met the required Learning Outcomes.

1. COMPETENCY PROFILE CHART (CPC)

Unit of Competency Category	Competence Unit Coding	Competence Unit Title
Generic	GEN-02-01	Use of Relevant Technology
	GEN-02-02	Apply Numeracy
	GEN-02-03	Communicate in Workplace
	GEN-02-04	Life Skills for Personal Development
	GEN-02-05	Understand Health, Safety, Environment and Quality Processes in The Oil and Gas Industry
Specialised	WEL-03-01	Apply Health, Safety and Environment including Quality Practices for Welding in The Oil and Gas Industry
	WEL-03-02	Understand Welding Technology and Inspection
	WEL-03-03	Practice Welding Fabrication
	WEL-03-04	Perform Oxy-Fuel Gas Cutting
	WEL-03-05	Perform Shielded Metal Arc Welding (SMAW)
	WEL-03-06	Perform Gas Tungsten Arc Welding (GTAW)

**It is mandatory to include Melayu Islam Beraja and Islamic Religious Knowledge in the qualification*

1.1 Generic

DUTY: 1. Use of Relevant Technology

Skill Areas / Competence	Competence Elements
1.1 Understand the Elements of Computer Systems and Their Peripherals in The Workplace	1.1.1 Identify typical computer hardware systems in the workplace
	1.1.2 Identify computer system peripherals
1.2 Understand the Types of Operating Systems and GUI Applications	1.2.1 Describe the common types of operating system found on workplace computer systems
	1.2.2 Explain what a GUI application is
1.3 Be Able to Use Operating Systems to Perform System and File Tasks	1.3.1 Demonstrate correct procedures for operating a computer system
	1.3.2 Demonstrate appropriate use of input and output devices
	1.3.3 Complete system file and folder management operations
1.4 Be Able to Use an Internet Browser	1.4.1 Identify appropriate internet services
	1.4.2 Identify considerations for safe internet use
	1.4.3 Use an internet browser for required tasks
1.5 Be Able to Use Email to Exchange Information and Communicate	1.5.1 Identify terms used with email messaging
	1.5.2 Use email to send / receive messages and attachments
1.6 Be Able to Use Word Processing Software Applications	1.6.1 Identify software applications
	1.6.2 Identify software application file types
	1.6.3 Use word processing software applications to create and format documents
	1.6.4 Use printers to print documents
1.7 Be Able to Use Presentation Software Applications	1.7.1 Use presentation software applications to create and format presentations
	1.7.2 Use software application graphic interfaces

DUTY: 2. Apply Numeracy

Skill Areas / Competence	Competence Elements
2.1 Be Able to Use Numeric Expressions in Standard Form to Solve Work Related Problems	2.1.1 Carry out rounding of numbers and measures to an appropriate degree of accuracy
	2.1.2 Calculate values for sums, differences, products and quotients
	2.1.3 Carry out conversion of values in one form to another
	2.1.4 Assess calculation outcomes using approximation and estimation
2.2 Be Able to Use and Convert SI Units in The Workplace	2.2.1 State the fundamental SI units
	2.2.2 Apply appropriate SI unit prefixes to represent values
	2.2.3 Carry out conversion of one SI unit and prefix to another
2.3 Be Able to Use Algebra to Express and Solve Work Related Problems	2.3.1 Apply the laws and properties of indices
	2.3.2 Apply and interpret algebraic notation
	2.3.3 Simplify and manipulate algebraic expressions
	2.3.4 Carry out transposition of formulae to change the subject
	2.3.5 Apply the properties of logarithms in expressions
2.4 Be Able to Use Trigonometry to Solve Problems	2.4.1 Apply Pythagoras's theorem to calculate values in a triangle
	2.4.2 Apply trigonometric ratios to calculate values in shapes

DUTY: 3. Communicate in Workplace

Skill Areas / Competence	Competence Elements
3.1 Be Able to Effectively Read Workplace Information	3.1.1 Demonstrate reading of work-related texts, fluently and with good understanding
	3.1.2 Describe the difference between 'skimming' and 'scanning' documentation
	3.1.3 Demonstrate methods of extracting information from written workplace documentation
3.2 Be Able to Effectively Communicate with Others in The Working Environment	3.2.1 Explain the importance of effective communication skills in the workplace
	3.2.2 Describe the benefits of effective communication in relation to organisational performance
	3.2.3 Explain the effects that poor communication can have within a working environment
	3.2.4 Define the extent of when to act on your own initiative to find, clarify and evaluate information, and when to seek help and advice from others

	3.2.5 Demonstrate effective use of Spoken Standard English for the purposes of oral communication in the workplace
3.3 Be Able to Give and Respond to Workplace Instructions and Warnings	3.3.1 Describe the main types of workplace instructions and warnings
	3.3.2 Demonstrate effective interpretation and delivery of appropriate types of oral instructions and warnings relevant to the workplace
3.4 Be Able to Complete Documentation Relevant to The Work Environment and Tasks Required	3.4.1 Describe the types of reports found in the workplace and their purposes
	3.4.2 Produce workplace reports and logbooks to required industry and organisational standards
3.5 Be Able to Prepare and Deliver Presentations	3.5.1 Describe the main characteristics of effective oral presentations
	3.5.2 Describe the use of oral presentations in the workplace
	3.5.3 Carry out oral presentations related to workplace tasks / processes using appropriate supporting visual aids as required
3.6 Be Able to Seek and Apply for Relevant Career Opportunities	3.6.1 Identify appropriate career paths in industry
	3.6.2 Describe the stages of a typical job application process
	3.6.3 Identify resources to support career development with industrial certification
	3.6.4 Describe documents to support career development
	3.6.5 Demonstrate the appropriate completion of required job application documentation
	3.6.6 Undertake relevant job interviews demonstrating identified positive success traits

DUTY: 4. Life Skills for Personal Development

Skill Areas / Competence	Competence Elements
4.1 Be able to demonstrate effective self-management in the workplace	4.1.1 Recognise personal roles and responsibilities
	4.1.2 Carry out effective management of time
4.2. Be able to demonstrate effective planning and organising in the workplace	4.2.1 Demonstrate effective preparation for tasks
	4.2.2 Carry out effective organisation of resources

4.3 Be able to demonstrate effectively working with others in the workplace	4.3.1 Perform effective work as an individual/team
	4.3.2 Demonstrate the use of feedback for improvement
4.4 Be able to demonstrate problem-solving skills in the workplace	4.4.1 Demonstrate effective identification of problems
	4.4.2 Demonstrate effective problem solving
4.5 Be able to demonstrate initiative and enterprise in the workplace	4.5.1 Demonstrate proactive attitudes
	4.5.2 Produce a range of options for different situations
4.6 Be able to demonstrate progression in the ability to learn in the workplace	4.6.1 Demonstrate understanding of ongoing learning
	4.6.2 Demonstrate the ability to deal with current or changing environments

DUTY: 5. Understand Health, Safety, Environment and Quality Processes in The Oil and Gas Industry

Skill Areas / Competence	Competence Elements
5.1 Understand How Relevant Legislation and Procedures Apply in The Workplace	5.1.1 Identify roles and responsibilities related to current relevant Health and Safety legislation
	5.1.2 Identify roles and responsibilities related to current relevant environmental legislation
	5.1.3 Describe the use of workplace procedures
	5.1.4 Define the difference between 'policies' and 'rules'
5.2 Understand and Interpret Workplace Health and Safety Information	5.2.1 Describe sources of information relevant to workplace safety
	5.2.2 Interpret information relevant to workplace safety
5.3 Understand Procedures for Dealing with Health and Safety and Environmental	5.3.1 Differentiate between an 'accident' and an 'incident'
	5.3.2 Describe the possible consequences of an accident in the workplace
	5.3.3 State the procedures to be followed in the case of accidents involving injury (including first aid)
	5.3.4 Specify appropriate procedures to be followed when emergency situations occur in the workplace

Situations in The Workplace	5.3.5	State the actions to be taken where situations exceed and individual's level of responsibility for Health and Safety in the workplace
	5.3.6	Specify appropriate responsible persons who Health and Safety matters should be reported to
	5.3.7	Describe the ways in which the environment may be affected by work activities
	5.3.8	Specify the requirements for processing waste from the workplace
	5.3.9	Explain why it is important to report any hazards to the environment that arise from work procedures
5.4 Understand the Procedures for Establishing a Safe Working Environment	5.4.1	Define what is meant by the term 'risk' in relation to Health and Safety in the workplace
	5.4.2	State the procedure for producing risk assessments and method statements
	5.4.3	State the purpose of Personal Protective Equipment (PPE)
	5.4.4	Describe the procedures to remove or minimise risks
	5.4.5	Specify the use and maintenance of PPE (including full body harness) for work operations
	5.4.6	State the first aid facilities that must be available in the work area in accordance with Health and Safety regulations
	5.4.7	Explain why it is important not to misuse first aid equipment / supplies and to replace first aid supplies once used
	5.4.8	Describe safe practices and procedures for the use of equipment and materials in the working environment
	5.4.9	Explain the importance of behavioural safety and a positive safety culture
	5.4.10	Describe conditions linked to common occupational health problems
5.5 Understand the Requirements for Identifying and Dealing with Hazards in The Work Environment	5.5.1	Identify warning signs for the main groups of hazardous substances
	5.5.2	Define what is meant by the term 'hazard' in relation to Health and Safety in the workplace
	5.5.3	Identify main hazard groups associated with work tasks
	5.5.4	Describe general situations which can constitute a hazard in the workplace
	5.5.5	Describe oil, gas and petrochemical specific hazards
	5.5.6	Explain practices and procedures for addressing hazards in the workplace
	5.5.7	Identify the correct type of fire extinguisher for each particular type of fire
	5.5.8	Explain situations where chemical hazards may be encountered
5.6 Understand the Management of Asset Safety	5.6.1	Define asset integrity and process safety
	5.6.2	List the types of asset integrity in oil and gas/petrochemical operations
	5.6.3	Define safety critical elements of equipment and systems

in Oil and Gas / Petrochemical Operations	5.6.4	Define models and system approaches for risk management and control for safety critical elements
	5.6.5	Describe safe procedures for the isolation of live / charged equipment and overrides including electrical hazard
	5.6.6	Define the responsibilities of employers and employees in maintaining asset integrity
5.7 Understand the Hazards Associated with Mechanical Lifting Operations	5.7.1	Define mechanical lifting
	5.7.2	Identify health and safety considerations prior to conducting lifting activities
	5.7.3	Describe types of mechanical lifting equipment
	5.7.4	Describe hazards associated with mechanical lifting
	5.7.5	Define key personnel roles involved with lifting operations
	5.7.6	Define the term Safe Working Load (SWL)
5.8 Understand How to Complete Health and Safety Reporting in The Workplace	5.8.1	Describe Health and Safety-related monitoring and reporting
5.9 Understand How to Complete Quality Defect Reporting in The Workplace	5.9.1	Describe Quality Defect on materials related monitoring and reporting

1.2 Specialised

DUTY: 1. Apply Health, Safety and Environment including Quality Practice for Welding in The Oil and Gas Industry

Skill Areas / Competence	Competence Elements
1.1 Be Able to Apply Relevant Health and Safety Legislation and Procedures That Relate to The Workplace	1.1.1 Comply with relevant workplace Health and Safety including quality procedures and obligations
	1.1.2 Work within Health and Safety, quality requirements
	1.1.3 Apply procedures to ensure the safe use, maintenance and storage of materials (including chemicals), tools, plant / machinery and equipment as defined by relevant documentation including material preservation requirements
	1.1.4 Comply with relevant signage
	1.1.5 Apply procedures to ensure safety in the workplace by the correct use of PPE, guards, interlocks, barriers and notices
	1.1.6 Use access equipment correctly
	1.1.7 Demonstrate the use of PPE and full body harness
	1.1.8 Demonstrate safe manual and ergonomic handling techniques
1.2 Be Able to Assess the Workplace for Hazards and Identify Remedial Actions in Accordance with Health and Safety Legislation and Policy	1.2.1 Identify unsafe situations / conditions and take remedial actions
	1.2.2 Assess the workplace and revise work practices to account for hazards that could cause harm
	1.2.3 Undertake health and safety monitoring and reporting
1.3 Be Able Apply Relevant Environmental Legislation and Procedures That Relate to The Workplace	1.3.1 Comply with relevant workplace Environmental procedures and obligations as defined by current legislation and procedures
1.4 Be Able to Assess the Materials for Defect and identify Remedial Actions	1.4.1 Undertake Quality Defect monitoring and reporting

DUTY: 2. Understand Welding Technology and Inspection

Skill Areas / Competence	Competencies Elements
2.1 Understand the Correct Use of Oxy-Acetylene and Plasma Cutting Equipment and Supplies	2.1.1 Describe the principles involved with oxy-acetylene gas cutting processes
	2.1.2 Identify oxy-acetylene gas cutting equipment
	2.1.3 Describe the advantages and limitations of oxy-acetylene gas cutting processes
	2.1.4 Describe the procedures for the oxy-acetylene gas cutting process
	2.1.5 Describe cutting variables that affect the quality of the cutting process
	2.1.6 Describe the components of machine cutting equipment
	2.1.7 Identify cutting defect causes
2.2 Understand the Correct Use of Plasma Cutting Equipment and Supplies	2.2.1 Describe the principles of plasma arc cutting
	2.2.2 Identify the main types of plasma arc cutting processes
	2.2.3 Identify plasma arc cutting equipment
	2.2.4 Identify the components forming plasma arc cutting equipment
	2.2.5 Describe gas composition for plasma cutting processes
	2.2.6 Describe the fundamental process of plasma cutting
	2.2.7 Explain the importance of variables with regards to the ability to make a good quality cut using plasma arc cutting processes
	2.2.8 Describe advantages and limitations of plasma cutting
	2.2.9 Explain the difference between plasma arc cutting processes and oxy-acetylene cutting processes
	2.2.10 Identify plasma arc cutting defects
2.3 Understand the Shielded Metal Arc Welding Process (SMAW)	2.3.1 Explain the shielded metal arc welding (SMAW) process and the basic requirements for welding using it
	2.3.2 Describe typical power sources used in SMAW and their parameters
	2.3.3 Describe the function, classification, selection and care of the SMAW welding consumables
	2.3.4 Describe SMAW techniques
	2.3.5 Describe appropriate joint types for welds
	2.3.6 Describe methods of welding joint preparation
	2.3.7 Identify weld defects in SMAW and their possible causes
	2.3.8 Describe visual inspection acceptance criteria for welds
2.4 Understand Gas Tungsten Arc Welding (GTAW) Process	2.4.1 Explain the Gas Tungsten Arc Welding (GTAW) process and its principles
	2.4.2 Identify the basic requirements of GTAW welding systems
	2.4.3 Describe the basic types of GTAW machines
	2.4.4 Identify the parts of GTAW torch equipment
	2.4.5 Describe the functions of the GTAW cables and hoses
	2.4.6 Describe electrode type designations for GTAW equipment
	2.4.7 Identify safety considerations when GTAW equipment
	2.4.8 Identify common weld defects in GTAW welds

	2.4.9	Describe visual inspection acceptance criteria for welds
2.5 Understand Thermal Gouging Processes	2.5.1	Describe the principles of thermal gouging processes
	2.5.2	Describe the use and application of gouging processes
	2.5.3	Identify the equipment and components used in gouging processes
	2.5.4	Describe the advantages and disadvantages of the gouging process

DUTY: 3. Practice Welding Fabrication

Skill Areas / Competence	Competencies Elements	
3.1 Be Able to Recognise and Use Measuring Equipment to Complete Engineering Tasks	3.1.1	Describe appropriate measuring equipment and systems used for engineering tasks
	3.1.2	Select appropriate measurement instruments / tools used for engineering tasks
	3.1.3	Perform accurate measurement and readings of engineering objects / materials
3.2 Be Able to Recognise and Use Appropriate Engineering Hand Tools	3.2.1	Identify typical hand tools used in engineering operations
	3.2.2	Select appropriate hand tools for defined engineering operations
	3.2.3	Perform engineering operations using appropriate hand tools to defined specifications
	3.2.4	Demonstrate appropriate maintenance and storage of hand tools in accordance with organisational procedures
3.3 Be Able to Recognise and Use Equipment to Complete Engineering Layout Procedures	3.3.1	Identify equipment used in layout marking procedures
	3.3.2	Perform engineering layout marking procedures
3.4 Be Able to Recognise and Use Hand-Held Power Tools for Engineering Operations	3.4.1	Identify typical power tools used in engineering operations
	3.4.2	Select appropriate power tools for defined engineering operations
	3.4.3	Perform engineering operations using appropriate power tools
	3.4.4	Demonstrate appropriate maintenance and storage of hand tools in accordance with organisational procedures
3.5 Be Able to Recognise and Use Power Saws for Engineering Operations	3.5.1	Identify types of power saws and their uses
	3.5.2	Identify key parts of a power saw
	3.5.3	Describe the safety precautions required for power saw operation
	3.5.4	Perform inspection of power saws for safe use and operation
	3.5.5	Select and fit suitable power saw blades for engineering applications

	3.5.6 Describe the advantages and limitations of different types of power saws
	3.5.7 Perform cutting operations using power saws
3.6 Be Able to Interpret and Use Engineering Drawings and Sketches	3.6.1 Interpret drawings and sketches to complete engineering tasks
	3.6.2 Interpret welding symbol information for use in engineering operations

DUTY: 4. Perform Oxy-Fuel Gas Cutting

Skill Areas / Competence	Competencies Elements
4.1 Be Able to Cut Metal Using Oxy-Fuel Gas Cutting Processes	4.1.1 Demonstrate the correct procedures in assembling and checking oxy-fuel gas cutting equipment
	4.1.2 Demonstrate the correct processes and adjustments for the lighting and shutting down of oxy-fuel gas cutting equipment
	4.1.3 Perform appropriate methods of oxy-fuel gas cutting using manual equipment
	4.1.4 Perform appropriate methods of oxy-fuel gas cutting using automatic equipment

DUTY: 5. Perform Shielded Metal Arc Welding (SMAW)

Skill Areas / Competence	Competencies Elements
5.1 Be Able to Join Metal Using Shielded Metal Arc Welding (SMAW) Processes	5.1.1 Demonstrate appropriate assembly and checks of SMAW equipment to complete welding processes
	5.1.2 Demonstrate requirements of metal weld preparation prior to final welding taking place
	5.1.3 Perform appropriate methods to strike an arc
	5.1.4 Produce welded beads in all positions
	5.1.5 Produce welded joints to defined industry standards in all positions

DUTY: 6. Perform Gas Tungsten Arc Welding (GTAW)

Skill Areas / Competence	Competencies Elements
6.1 Be Able to Join Metal Using Gas Tungsten Arc Welding (GTAW) Processes	6.1.1 Demonstrate appropriate assembly and checks of GTAW equipment to complete welding processes
	6.1.2 Demonstrate requirements of electrode preparation prior to final welding taking place
	6.1.3 Demonstrate requirements for adjusting shielding
	6.1.4 Demonstrate requirements for establishing and setting of correct current for type of metal to be welded
	6.1.5 Produce welded beads in all positions

	6.1.6 Produce welded joints to defined industry standards in all positions
	6.1.7 Carry out tests on welded joints
6.2 Be Able to Join Carbon Steel Using Combination Welding Processes (GTAW+SMAW)	6.2.1 Produce GTAW+SMAW combination welded joints

2. COMPETENCY STANDARDS

2.1 Generic

Duty	1. Use of Relevant Technology	
Competence	Performance Criteria	
1.1 UNDERSTAND THE ELEMENTS OF COMPUTER SYSTEMS AND THEIR PERIPHERALS IN THE WORKPLACE	1. Identify typical computer hardware systems in the workplace 2. Identify computer system peripherals <u>Range</u> 1.1.1 Computer hardware systems: <ul style="list-style-type: none"> ▪ Desktop computers <ul style="list-style-type: none"> ○ Standalone ○ Network ▪ Laptop computers ▪ Tablets ▪ Plant integrated 1.1.2 Peripherals: <ul style="list-style-type: none"> ▪ Monitors ▪ Scanners ▪ Printers ▪ Mouse ▪ Keyboard ▪ Projectors 	
1.2 UNDERSTAND THE TYPES OF OPERATING SYSTEMS AND GUI APPLICATIONS	1. Describe the common types of operating system found on workplace computer systems 2. Explain what a GUI application is <u>Range</u> 1.2.1 Operating systems: <ul style="list-style-type: none"> ▪ Windows ▪ Linux ▪ Macintosh 	
1.3 BE ABLE TO USE OPERATING SYSTEMS TO PERFORM SYSTEM AND FILE TASKS	1. Demonstrate correct procedures for operating a computer system 2. Demonstrate appropriate use of input and output devices 3. Complete system file and folder management operations <u>Range</u> 1.3.1 Procedures: <ul style="list-style-type: none"> ▪ Powering a computer system up 	

	<ul style="list-style-type: none"> ▪ Logging into an operating system ▪ Logging out from an operating system ▪ Shutting a computer system down <p>1.3.2 Input and output devices:</p> <ul style="list-style-type: none"> ▪ QUERTY keyboard ▪ Mouse ▪ Touch screen ▪ Digital camera ▪ Scanners ▪ Printers <p>1.3.3 Management operations:</p> <ul style="list-style-type: none"> ▪ Folders <ul style="list-style-type: none"> ○ Create ○ Rename ○ Delete ▪ Files <ul style="list-style-type: none"> ○ Create ○ Copy ○ Move ○ Rename ○ Delete ▪ View files/directories ▪ Complete file search
<p>1.4 BE ABLE TO USE AN INTERNET BROWSER</p>	<ol style="list-style-type: none"> 1. Identify appropriate internet services 2. Identify considerations for safe internet use 3. Use an internet browser for required tasks <p><u>Range</u></p> <p>1.4.1 Internet services:</p> <ul style="list-style-type: none"> ▪ Internet Service Providers (ISPs) ▪ Webmail accounts (IMAP, POP3 and Microsoft Exchange) <p>1.4.2 Considerations:</p> <ul style="list-style-type: none"> ▪ Viruses ▪ Phishing ▪ Fraud ▪ Legal

	<p>1.4.3 Tasks:</p> <ul style="list-style-type: none"> ▪ Search for defined topics ▪ Use hyperlinks ▪ Create favourites ▪ Use browsing history ▪ Use Uniform Resource Locators (URLs)
<p>1.5 BE ABLE TO USE EMAIL TO EXCHANGE INFORMATION AND COMMUNICATE</p>	<ol style="list-style-type: none"> 1. Identify terms used with email messaging 2. Use email to send / receive messages and attachments <p><u>Range</u></p> <p>1.5.1 Terms:</p> <ul style="list-style-type: none"> ▪ Inbox, Outbox, Sent, Drafts ▪ Attachments ▪ Forward, Reply ▪ Cc, Bcc <p>1.5.2 Send/receive messages:</p> <ul style="list-style-type: none"> ▪ Subject/title inclusion ▪ Recipients ▪ Manage emails (folders)
<p>1.6 BE ABLE TO USE WORD PROCESSING SOFTWARE APPLICATIONS</p>	<ol style="list-style-type: none"> 1. Identify software applications 2. Identify software application file types 3. Use word processing software applications to create and format documents 4. Use printers to print documents <p><u>Range</u></p> <p>1.6.1 Software applications:</p> <ul style="list-style-type: none"> ▪ Word processing ▪ Presentation <p>1.6.2 File types:</p> <ul style="list-style-type: none"> ▪ .doc, .xls, .pdf, .jpg, .ppt <p>1.6.3 Create and format documents:</p> <p>Using:</p> <ul style="list-style-type: none"> ▪ Text <ul style="list-style-type: none"> ○ Font style, font size, text enhancement, copy/cut, move ▪ Paragraph <ul style="list-style-type: none"> ○ Alignment, spacing, indenting ▪ Page

	<ul style="list-style-type: none"> ○ Size, orientation, margins, header/footer, numbering, headings (with different levels) ▪ Document <ul style="list-style-type: none"> ○ New page ○ Section break ○ Footnotes ○ Tables ○ Spell checking/grammar ○ Printing ○ Saving <p>1.6.4 Print:</p> <ul style="list-style-type: none"> ▪ To a dedicated printer ▪ Print sections and/or specified pages
<p>1.7 BE ABLE TO USE PRESENTATION SOFTWARE APPLICATIONS</p>	<ol style="list-style-type: none"> 1. Use presentation software applications to <i>create and format presentations</i> 2. Use software application <i>graphic interfaces</i> <p><u>Range</u></p> <p>1.7.1 Create and format presentations:</p> <p>Using:</p> <ul style="list-style-type: none"> ▪ Text <ul style="list-style-type: none"> ○ Font style, font size, text enhancement, ▪ Slide <ul style="list-style-type: none"> ○ Animation ○ Sequencing ○ Video/sound ○ Style/format ▪ Presentation <ul style="list-style-type: none"> ○ Retrieve ○ Edit ○ Save ○ Sequence <p>1.7.2 Graphic interface:</p> <ul style="list-style-type: none"> ▪ Ribbon ▪ Mini-toolbar ▪ Quick access buttons ▪ Short-cuts

Duty	2. Apply Numeracy
Competence	Performance Criteria
2.1 BE ABLE TO USE NUMERIC EXPRESSIONS IN STANDARD FORM TO	1. Carry out rounding of numbers and measures to an appropriate <i>degree of accuracy</i>

<p>SOLVE WORK RELATED PROBLEMS</p>	<ol style="list-style-type: none"> 2. Calculate values for sums, differences, products and quotients 3. Carry out conversion of values in one form to another 4. Assess calculation outcomes using approximation and estimation <p><u>Range</u></p> <p>2.1.1 Degree of accuracy:</p> <ul style="list-style-type: none"> ▪ Significant figures ▪ Decimal places <p>2.1.2 Values:</p> <ul style="list-style-type: none"> ▪ Integers ▪ Decimals ▪ Simple fractions (proper and improper) ▪ Mixed numbers – both positive and negative ▪ Ratio ▪ Proportion (direct and indirect) ▪ Percentage (error, efficiency, increase, decrease) <p>2.1.3 Conversion:</p> <ul style="list-style-type: none"> ▪ Fraction ▪ Decimal ▪ Percentage
<p>2.2 BE ABLE TO USE AND CONVERT SI UNITS IN THE WORKPLACE</p>	<ol style="list-style-type: none"> 1. State the fundamental SI units 2. Apply appropriate SI unit prefixes to represent values 3. Carry out conversion of one SI unit and prefix to another <p><u>Range</u></p> <p>2.2.1 SI units:</p> <ul style="list-style-type: none"> ▪ Length (metres - m) ▪ Time (seconds - s) ▪ Temperature (kelvin – k) ▪ Mass (kilograms – kg) <p>2.2.2 Prefixes:</p> <ul style="list-style-type: none"> ▪ milli ▪ centi ▪ kilo
<p>2.3 BE ABLE TO USE ALGEBRA TO EXPRESS</p>	<ol style="list-style-type: none"> 1. Apply the laws and properties of indices 2. Apply and interpret algebraic notation

<p>AND SOLVE WORK RELATED PROBLEMS</p>	<p>3. <i>Simplify and manipulate</i> algebraic expressions</p> <p>4. Carry out <i>transposition</i> of formulae to change the subject</p> <p>5. Apply the properties of logarithms in <i>expressions</i></p> <p><u>Range</u></p> <p>2.3.1 Indices:</p> <ul style="list-style-type: none"> ▪ Simplify algebraic expressions ▪ Solve numeric expressions <p>2.3.3 Simplify and manipulate:</p> <ul style="list-style-type: none"> ▪ Substitution ▪ Collecting like terms ▪ Multiplying a single term over a bracket ▪ Taking out common factors ▪ Expanding products of two or more binomials ▪ Factorising quadratic expressions ▪ Simplifying expressions involving sums, products and powers <p>2.3.4 Transposition:</p> <ul style="list-style-type: none"> ▪ One or more terms ▪ Indices and roots <p>2.3.5 Expressions:</p> <ul style="list-style-type: none"> ▪ Algebraic ▪ Indicial ▪ Converting between logarithmic and index form
<p>2.4 BE ABLE TO USE TRIGONOMETRY TO SOLVE PROBLEMS</p>	<p>1. Apply Pythagoras's theorem to calculate values in a triangle</p> <p>2. Apply <i>trigonometric ratios</i> to calculate <i>values</i> in shapes</p> <p><u>Range</u></p> <p>2.4.2 Trigonometric ratios:</p> <ul style="list-style-type: none"> ▪ Sine ▪ Cosine ▪ Tangent <p>Values:</p> <ul style="list-style-type: none"> ▪ Angle ▪ Length

	▪ Area
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Duty	3. Communicate in Workplace
Competence	Performance Criteria
3.1 BE ABLE TO EFFECTIVELY READ WORKPLACE INFORMATION	<ol style="list-style-type: none"> 1. Demonstrate reading of work-related texts, fluently and with good understanding 2. Describe the difference between 'skimming' and 'scanning' documentation 3. Demonstrate methods of extracting information from written workplace documentation <p><u>Range</u></p> <p>3.1.3 Methods:</p> <ul style="list-style-type: none"> ▪ Skimming ▪ Scanning <p><i>Documentation (including):</i></p> <ul style="list-style-type: none"> ▪ Safety instructions ▪ Job instructions ▪ Material specifications ▪ Planning documentation ▪ Drawing instructions ▪ Finishing specifications ▪ Quality control documents ▪ Test schedules ▪ Reference tables/charts ▪ Operation sheets ▪ Manufacturers' instructions ▪ National, international and organisational standards ▪ Process specifications ▪ Work procedure specifications
3.2 BE ABLE TO EFFECTIVELY COMMUNICATE WITH OTHERS IN THE WORKING ENVIRONMENT	<ol style="list-style-type: none"> 1. Explain the importance of effective communication skills in the workplace 2. Describe the benefits of effective communication in relation to organisational performance 3. Explain the effects that poor communication can have within a working environment 4. Define the extent of when to act on your own initiative to find, clarify and evaluate information, and when to seek help and advice from others

	<p>5. Demonstrate effective use of Spoken Standard English for the purposes of oral communication in the workplace</p> <p><u>Range</u></p> <p>3.2.2 Organisational performance:</p> <ul style="list-style-type: none"> ▪ Operationally ▪ Safety management ▪ Interpersonal/morale <p>3.3.3 Working environment:</p> <ul style="list-style-type: none"> ▪ Operationally ▪ Safety management and risk ▪ Interpersonal working relationships <p>3.3.5 Spoken Standard English:</p> <ul style="list-style-type: none"> ▪ Audible ▪ Intelligible ▪ Appropriate to work setting ▪ Expresses required information ▪ Is structured ▪ Meets the needs of the recipient(s) ▪ Provides opportunity for feedback/questions as appropriate ▪ Polite
<p>3.3 BE ABLE TO GIVE AND RESPOND TO WORKPLACE INSTRUCTIONS AND WARNINGS</p>	<p>1. Describe the main types of workplace instructions and warnings</p> <p>2. Demonstrate effective interpretation and delivery of appropriate types of oral instructions and warnings relevant to the workplace</p> <p><u>Range</u></p> <p>3.3.1 Types:</p> <ul style="list-style-type: none"> ▪ Safety related <ul style="list-style-type: none"> ○ Mandatory ○ Prohibition ○ Warning ○ Emergency information ▪ Task related ▪ Organisation-based ▪ Interpersonal/supervisory <p>3.3.2 Types:</p>

	<ul style="list-style-type: none"> ▪ Safety related <ul style="list-style-type: none"> ○ Mandatory ○ Prohibition ○ Warning ○ Emergency information ▪ Task related ▪ Organisation-based ▪ Interpersonal/supervisory
<p>3.4 BE ABLE TO COMPLETE DOCUMENTATION RELEVANT TO THE WORK ENVIRONMENT AND TASKS REQUIRED</p>	<ol style="list-style-type: none"> 1. Describe the types of reports found in the workplace and their purposes 2. Produce workplace reports and logbooks to required industry and organisational standards <p><u>Range</u></p> <p>3.4.1 Types of reports:</p> <ul style="list-style-type: none"> ▪ Safety ▪ Accident/Incident ▪ Equipment maintenance ▪ Work progress/completion ▪ Inspection ▪ Logbooks <p>3.4.2 Standards:</p> <ul style="list-style-type: none"> ▪ Using industry conventions ▪ Using organisational protocols ▪ Using appropriate Standard English ▪ Using clear structure and layout
<p>3.5 BE ABLE TO PREPARE AND DELIVER PRESENTATIONS</p>	<ol style="list-style-type: none"> 1. Describe the main characteristics of effective oral presentations 2. Describe the use of oral presentations in the workplace 3. Carry out oral presentations related to workplace tasks / processes using appropriate supporting visual aids as required <p><u>Range</u></p> <p>3.5.1 Characteristics:</p> <ul style="list-style-type: none"> ▪ Selecting appropriate information ▪ Organising information effectively ▪ Planning for different audiences ▪ Using persuasive language and tone <p>3.5.2 Use:</p>

	<ul style="list-style-type: none"> • Work task reporting • Safety briefing • Project presentations • Training <p>3.5.3 Supporting visual aids:</p> <ul style="list-style-type: none"> ▪ Presentation software ▪ Reference documentation ▪ Supporting delivery materials (handouts)
<p>3.6 BE ABLE TO SEEK AND APPLY FOR RELEVANT CAREER OPPORTUNITIES</p>	<ol style="list-style-type: none"> 1. Identify appropriate career paths in industry 2. Describe the stages of a typical job application process 3. Identify resources to support career development with industrial certification 4. Describe documents to support career development 5. Demonstrate the appropriate completion of required job application documentation 6. Undertake relevant job interviews demonstrating identified positive success traits <p><u>Range</u></p> <p>3.6.2 Application process:</p> <ul style="list-style-type: none"> ▪ Update/Create CV ▪ Complete a Cover Letter. ▪ Complete Job Applications. ▪ Job Application Screening (employer) ▪ Complete aptitude tests ▪ Complete interview(s) ▪ Screening/references ▪ Job Offer <p>3.6.3 Resources:</p> <ul style="list-style-type: none"> ▪ Internet ▪ Trade publications ▪ Organisation bulletins ▪ Professional bodies/organisations ▪ Industry research papers ▪ Mentors ▪ Networking ▪ Job descriptions ▪ Person specification ▪ Awarding organisations <p>3.6.4 Documentation:</p>

	<ul style="list-style-type: none"> ▪ Curriculum Vitae (CV) ▪ Personal statement ▪ Cover letter ▪ References <p>3.6.6 Success traits:</p> <ul style="list-style-type: none"> ▪ Thorough job knowledge ▪ Appearance (clothing) ▪ Mannerisms ▪ Attentiveness ▪ Positive responses ▪ Demeanour and ethics
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Duty	4. Life Skills for Personal Development
Competence	Performance Criteria
4.1 BE ABLE TO DEMONSTRATE EFFECTIVE SELF-MANAGEMENT IN THE WORKPLACE	<ol style="list-style-type: none"> 1. Recognise <i>personal roles and responsibilities</i> 2. Carry out effective <i>management of time</i> <p><u>Range</u></p> <p>4.1.1 Personal roles and responsibilities:</p> <ul style="list-style-type: none"> ▪ Able to demonstrate self-control in challenging situations ▪ Able to engage in learning activities ▪ Able to demonstrate commitment to work and learning ▪ Able to undertake responsibility for effort and actions <p>4.1.2 Management of time:</p> <ul style="list-style-type: none"> ▪ Able to demonstrate punctuality ▪ Able to allocate appropriate time to activities ▪ Able to meet deadlines ▪ Able to prioritise tasks
4.2 BE ABLE TO DEMONSTRATE EFFECTIVE PLANNING AND ORGANISING IN THE WORKPLACE	<ol style="list-style-type: none"> 1. Demonstrate effective <i>preparation</i> for tasks 2. Carry out effective <i>organisation of resources</i> <p><u>Range</u></p> <p>4.2.1 Preparation:</p> <ul style="list-style-type: none"> ▪ Able to identify the objectives of a task ▪ Able to gather resources to meet task objectives ▪ Able to use appropriate planning tools (e.g. checklist, Gantt chart) ▪ Able to prepare for contingencies

	<p>4.2.2 Organisation of resources:</p> <ul style="list-style-type: none"> ▪ Able to identify critical tasks ▪ Able to arrange tasks in a logical order ▪ Able to allocate resources to complete tasks ▪ Able to use relevant information to complete tasks
<p>4.3 BE ABLE TO DEMONSTRATE EFFECTIVELY WORKING WITH OTHERS IN THE WORKPLACE</p>	<p>1. Perform effective <i>work as an individual/team</i> 2. Demonstrate the use of <i>feedback for improvement</i></p> <p><u>Range</u></p> <p>4.3.1 Work as an individual/team:</p> <ul style="list-style-type: none"> ▪ Able to demonstrate willingness to take up responsibilities ▪ Able to partake in discussions with team members ▪ Able to provide support to the team ▪ Able to work together with others towards common team goals <p>4.3.2 Feedback for improvement:</p> <ul style="list-style-type: none"> ▪ Able to provide positive feedback ▪ Able to identify areas for improvement ▪ Able to accept and learn from mistakes ▪ Able to encourage team member to improve
<p>4.4 BE ABLE TO DEMONSTRATE PROBLEM-SOLVING SKILLS IN THE WORKPLACE</p>	<p>1. Demonstrate effective <i>identification of problems</i> 2. Demonstrate effective <i>problem solving</i></p> <p><u>Range</u></p> <p>4.4.1 Identification of problems:</p> <ul style="list-style-type: none"> ▪ Able to evaluate problems ▪ Able to analyse problems ▪ Able to gather information relating to problems ▪ Able to relate knowledge to problems <p>4.4.2 Problem solving:</p> <ul style="list-style-type: none"> ▪ Able to generate strategies to solve problems ▪ Able to explore different solutions ▪ Able to apply strategies according to situation ▪ Able to monitor and reflect on results
<p>4.5 BE ABLE TO DEMONSTRATE INITIATIVE AND ENTERPRISE IN THE WORKPLACE</p>	<p>1. Demonstrate <i>proactive attitudes</i> 2. Produce a <i>range of options for different situations</i></p> <p><u>Range</u></p> <p>4.5.1 Proactive attitudes:</p> <ul style="list-style-type: none"> ▪ Able to anticipate potential problems ▪ Able to act quickly to resolve problems

	<ul style="list-style-type: none"> ▪ Able to recognise and use opportunities ▪ Able to initiate possible solutions <p>4.5.2 Range of options for different situations:</p> <ul style="list-style-type: none"> ▪ Able to generate innovative ideas to solve problems ▪ Able to identify problems that may occur ▪ Able to apply suitable ideas into action ▪ Able to apply appropriate skills to given situations/tasks
4.6 BE ABLE TO DEMONSTRATE PROGRESSION IN THE ABILITY TO LEARN IN THE WORKPLACE	<ol style="list-style-type: none"> 1. Demonstrate <i>understanding of ongoing learning</i> 2. Demonstrate the ability to deal with <i>current or changing environments</i> <p><u>Range</u></p> <p>4.6.1 Understanding of ongoing learning:</p> <ul style="list-style-type: none"> ▪ Able to demonstrate motivation to learn new ideas ▪ Able to undertake mentoring and coaching activities ▪ Able to demonstrate independent learning ▪ Able to demonstrate efforts to improve knowledge <p>4.6.2 Current or changing environments:</p> <ul style="list-style-type: none"> ▪ Able to apply knowledge into work activities ▪ Able to use a range of media to learn ▪ Able to adapt to a changing environment ▪ Able to accept challenges positively

Duty	5. Understand Health, Safety, Environment and Quality Processes in The Oil and Gas Industry	
	Competence	Performance Criteria
	5.1 UNDERSTAND HOW RELEVANT LEGISLATION AND PROCEDURES APPLY IN THE WORKPLACE	<ol style="list-style-type: none"> 1. Identify <i>roles</i> and responsibilities related to current relevant <i>Health and Safety legislation</i> 2. Identify roles and responsibilities related to current relevant <i>environmental legislation</i> 3. Describe the use of <i>workplace procedures</i> 4. Define the difference between ‘policies’ and ‘rules’ <p><u>Range</u></p> <p>5.1.1 Roles:</p> <ul style="list-style-type: none"> ▪ Employers ▪ Employees

	<ul style="list-style-type: none"> ▪ Organisations <p>Health and Safety legislation:</p> <ul style="list-style-type: none"> ▪ Workplace Safety and Health Order 2009 ▪ Workplace Safety and Health Regulations 2014 ▪ Fire Safety Order 2016 ▪ Employment Order 2009 ▪ National Standard Operating Procedure (NaSOP) for Disaster Management ▪ Working at heights Regulations (2005) <p>5.1.2 Environmental legislation:</p> <ul style="list-style-type: none"> ▪ Environment Order 2009 ▪ Environment Protection and Management Order 2015 <p>5.1.3 Workplace procedures:</p> <ul style="list-style-type: none"> ▪ Safety management ▪ Environmental management ▪ Incident reporting and investigation ▪ Proactive intervention
<p>5.2 UNDERSTAND AND INTERPRET WORKPLACE HEALTH AND SAFETY INFORMATION</p>	<ol style="list-style-type: none"> 1. Describe sources of information relevant to workplace safety 2. Interpret information relevant to workplace safety <p>Range</p> <p>5.2.1 Sources of information:</p> <ul style="list-style-type: none"> ▪ Location of information ▪ Access arrangements <p>5.2.2 Information:</p> <ul style="list-style-type: none"> ▪ Workplans ▪ Organisational/ company policies and procedures ▪ Project/ Site safety plan ▪ Emergency plan ▪ Training manuals ▪ Legislation/ regulations/ codes of practice ▪ Standard Operating Procedures (S.O.P.)

5.3 UNDERSTAND PROCEDURES FOR DEALING WITH HEALTH AND SAFETY AND ENVIRONMENTAL SITUATIONS IN THE WORKPLACE

1. Differentiate between an 'accident' and an 'incident'.
2. Describe the possible **consequences** of an accident in the workplace
3. State the procedures to be followed in the case of accidents involving injury (including first aid)
4. Specify **appropriate procedures** to be followed when emergency situations occur in the workplace
5. State the actions to be taken where situations exceed an individual's level of responsibility for Health and Safety in the workplace
6. Specify appropriate **responsible persons** who Health and Safety matters should be reported to.
7. Describe the ways in which the environment may be **affected by work activities**
8. Specify the **requirements** for processing waste from the workplace
9. Explain why it is important to report any hazards to the environment that arise from work procedures

Range

5.3.2 Consequences

- Fatality
- Temporary disability
- Permanent disability
- Minor injury

5.3.4 Appropriate procedures:

- Procedures for summoning emergency services
- Information that emergency services require
- Alarm and evacuation procedures
- Designated escape routes
- Firefighting procedures
- Application of first aid

5.3.6 Responsible persons:

- Employer
- Employees
- Safety Officers
- Health & Safety Inspectors

5.3.7 Affected by work activities:

- Land contamination

	<ul style="list-style-type: none"> ▪ Air pollution ▪ Pollution of water courses <p>5.3.8 Requirements:</p> <ul style="list-style-type: none"> ▪ Recycling ▪ Hazardous waste
<p>5.4 UNDERSTAND THE PROCEDURES FOR ESTABLISHING A SAFE WORKING ENVIRONMENT</p>	<ol style="list-style-type: none"> 1. Define what is meant by the term ‘risk’ in relation to Health and Safety in the workplace 2. State the procedure for producing risk assessments and method statements 3. State the purpose of Personal Protective Equipment (PPE) 4. Describe the procedures to remove or minimise risks 5. Specify the use and maintenance of PPE (including full body harness) for work operations 6. State the first aid facilities that must be available in the work area in accordance with Health and Safety regulations 7. Explain why it is important not to misuse first aid equipment/supplies and to replace first aid supplies once used 8. Describe safe practices and procedures for the use of equipment and materials in the working environment 9. Explain the importance of behavioural safety and a positive safety culture. 10. Describe conditions linked to common occupational health problems <p><u>Range</u></p> <p>5.4.4 Procedures to remove or minimise risks</p> <ul style="list-style-type: none"> ▪ As Low As Reasonably Practicable (ALARP) principle ▪ Hazard Identification Risk Assessment (HIRA) ▪ Hierarchy of control measures <ul style="list-style-type: none"> ○ Elimination ○ Substitution ○ Engineering Control ○ Administration Control ○ Personal Protective Equipment (PPE) ▪ Risk management <ul style="list-style-type: none"> ○ Strategy ○ Identify hazards ○ Assess associated risk

- Use approved control measures to eliminate/minimise risks
- Monitor and review control measures

5.4.5 PPE (use)

- Footwear
- Head protection
- Hand gloves
- Protective clothing
- Hearing protection
- Eye protection
- Full body harness (fall arrest/fall restraint - including lanyards and inertia reels – covering inspection, wear and usage)

5.4.5 PPE (maintenance)

- Cleaning and decontamination
- Correct storage
- Regular checks for damage
- Repair/replacement of work malfunction or damaged equipment/parts
- Disposal of single use equipment

5.4.8 Procedures

- Qualified persons
- Safe isolation procedures
- Permits to work
- Selection and checking correct plant, power tools, hand tools or equipment
- Toolbox talks
- Maintenance and inspection activities
- Safety Management Systems
- Safe Systems of Work (SSoW)
- Shift handover procedures
- Housekeeping
- Storage and containment
- Health surveillance
- Safe Manual handling techniques

5.4.8 Equipment and materials

	<ul style="list-style-type: none"> ▪ Access equipment ▪ Plant/Machinery ▪ Portable power tools ▪ Signs and guarding ▪ Tools and materials storage facilities ▪ Hazardous substances <p>5.4.10 Conditions</p> <ul style="list-style-type: none"> ▪ Skin disease ▪ Cancer ▪ Hearing loss ▪ Sight impairment ▪ Respiratory illness ▪ Musculoskeletal disorder ▪ Physiological disorder
<p>5.5 UNDERSTAND THE REQUIREMENTS FOR IDENTIFYING AND DEALING WITH HAZARDS IN THE WORK ENVIRONMENT</p>	<ol style="list-style-type: none"> 1. Identify warning signs for the main groups of hazardous substances. 2. Define what is meant by the term ‘hazard’ in relation to Health and Safety in the workplace 3. Identify main hazard groups associated with work tasks 4. Describe general situations which can constitute a hazard in the workplace 5. Describe oil, gas and petrochemical specific hazards 6. Explain practices and procedures for addressing hazards in the workplace 7. Identify the correct type of fire extinguisher for each particular type of fire 8. Explain situations where chemical hazards may be encountered <p><u>Range</u></p> <p>5.5.3 Hazard groups:</p> <ul style="list-style-type: none"> ▪ Electric ▪ Psychosocial ▪ Ergonomic ▪ Biological ▪ Chemical ▪ Physical <p>5.5.4 General situations:</p> <ul style="list-style-type: none"> ▪ Temporary supplies

- Trailing leads/hoses
- Slippery or uneven surfaces
- Presence of dust, fumes and/or gases
- Handling and transporting equipment or materials (manual and mechanised handling)
- Chemical use and storage (including contaminants and irritants)
- Fire and flame
- Working at height
- Excessive noise
- Vibration
- Lone working
- Hazardous malfunctions of equipment
- Improper use, maintenance and storage of tools and equipment
- Improper use, maintenance of guarding and machinery

5.5.5 Specific hazards:

- Explosion
- High pressure release of gas
- Hydrogen Sulphide (H₂S) creation
- Structural failure
- Adverse weather damage
- Suspended loads on cranes (including man loading)
- Use of helicopters and supply vessels (offshore)
- High pressure systems

5.5.6 Hazards in the workplace:

- Trailing leads/hoses
- Slippery or uneven surfaces
- Presence of dust, fumes and/or gases
- Handling and transporting equipment or materials (manual and mechanised handling)
- Chemical use and storage (including contaminants and irritants)
- Fire and flame
- Working at height
- Confined spaces
- Hazardous malfunctions of equipment
- Improper use and storage of tools and equipment

	<ul style="list-style-type: none"> ▪ Radiation ▪ Lack of guarding on machinery ▪ Lack/damage emergency stop systems ▪ Scaffold collapse ▪ Failure and wear of scaffold components ▪ Non-qualified operatives ▪ Falling objects ▪ Electrocutation ▪ Noise ▪ Heat stress ▪ Eye injuries ▪ Oil, gas and petrochemical specific <p>5.5.8 Chemical hazards:</p> <ul style="list-style-type: none"> ▪ Painting and cleaning ▪ Drilling operations ▪ Well completion and maintenance ▪ Hazard freeing ▪ Asbestos lagging ▪ Naturally occurring radioactive materials (NORM)
<p>5.6 UNDERSTAND THE MANAGEMENT OF ASSET SAFETY IN OIL AND GAS / PETROCHEMICAL OPERATIONS</p>	<ol style="list-style-type: none"> 1. Define asset integrity and process safety 2. List the types of asset integrity in oil and gas/petrochemical operations 3. Define safety critical elements of equipment and systems 4. Define models and system approaches for risk management and control for safety critical elements 5. Describe safe procedures for the isolation of live/charged equipment and overrides 6. Define the responsibilities of employers and employees in maintaining asset integrity <p><u>Range</u></p> <p>5.6.2 Asset integrity:</p> <ul style="list-style-type: none"> ▪ Structural integrity ▪ Well integrity ▪ Fire and explosion prevention ▪ Refuge and evacuation <p>5.6.3 Safety critical elements:</p> <ul style="list-style-type: none"> ▪ Pressure relief valves

	<ul style="list-style-type: none"> ▪ Emergency shutdown systems ▪ Fire and gas detection systems ▪ Fire-fighting equipment <p>5.6.4 Models and system approaches:</p> <ul style="list-style-type: none"> ▪ Bowtie diagrams ▪ Swiss cheese model ▪ Hazard Effect Management Plan (HEMP)
<p>5.7 UNDERSTAND THE HAZARDS ASSOCIATED WITH MECHANICAL LIFTING OPERATIONS</p>	<ol style="list-style-type: none"> 1. Define mechanical lifting 2. Identify health and safety considerations prior to conducting lifting activities 3. Describe types of mechanical lifting equipment 4. Describe hazards associated with mechanical lifting 5. Define key personnel roles involved with lifting operations 6. Define the term Safe Working Load (SWL) <p><u>Range</u></p> <p>5.7.3 Types:</p> <ul style="list-style-type: none"> ▪ Forklifts ▪ Lifting trolleys ▪ Cranes (fixed and mobile) <p>5.7.4 Hazards:</p> <ul style="list-style-type: none"> ▪ Load stability ▪ Load security ▪ Load handling <p>5.7.5 Personnel roles:</p> <ul style="list-style-type: none"> ▪ Competent lifting person ▪ Crane operator ▪ Banksman ▪ Rigger/slinger
<p>5.8 UNDERSTAND HOW TO COMPLETE HEALTH AND SAFETY REPORTING IN THE WORKPLACE</p>	<ol style="list-style-type: none"> 1. Describe Health and Safety related monitoring and reporting <p><u>Range</u></p> <p>5.8.1 Monitoring and reporting:</p> <ul style="list-style-type: none"> ▪ Formal/ informal ▪ Compliant/non-compliant ▪ Verbal ▪ Written <ul style="list-style-type: none"> ○ Safety inspection report

	<ul style="list-style-type: none"> ○ Safety checklist ○ Incident/ Accidental reports
<p>5.9 UNDERSTAND HOW TO COMPLETE QUALITY DEFECT REPORTING IN THE WORKPLACE</p>	<p>1. Describe Quality Defect on materials related monitoring and reporting</p> <p><u>Range</u></p> <p>5.9.1 Quality Defect</p> <p>5.9.1 Monitoring and reporting:</p> <ul style="list-style-type: none"> ▪ Compliant/non-compliant ▪ Written <ul style="list-style-type: none"> ○ Specification ○ inspection report ○ Checklist

2.2 Specialised

Duty	1. Apply Health, Safety and Environment including Quality Practice for Welding in The Oil and Gas Industry	
Competence		Performance Criteria
<p>1.1 BE ABLE TO APPLY RELEVANT HEALTH AND SAFETY LEGISLATION AND PROCEDURES THAT RELATE TO THE WORKPLACE</p>	<ol style="list-style-type: none"> 1. Comply with relevant workplace Health and Safety including quality procedures and obligations as defined by: <ol style="list-style-type: none"> a. current legislation b. organisational procedures 2. Work within Health and Safety, quality requirements 3. Apply procedures to ensure the safe use, maintenance, preservation and storage of materials (including chemicals), tools, plant / machinery and equipment as defined by relevant documentation including material preservation requirements 4. Comply with relevant signage 5. Apply procedures to ensure safety in the workplace by the correct use of PPE, guards, interlocks, barriers and notices 6. Use access equipment correctly 7. Demonstrate the use of PPE and <i>full body harness</i> 8. Demonstrate safe manual and ergonomic handling techniques <p>Range</p> <p>1.1.1 Current legislation:</p> <ul style="list-style-type: none"> ▪ Workplace Safety and Health Order 2009 ▪ Workplace Safety and Health Regulations 2014 ▪ Fire Safety Order 2016 ▪ Employment Order 2009 ▪ National Standard Operating Procedure (NaSOP) for Disaster Management <p>1.1.1 Organisational procedures:</p> <ul style="list-style-type: none"> ▪ Safety rules and arrangements ▪ Work management procedures ▪ Waste management procedures <p>1.1.2 Requirements:</p> <ul style="list-style-type: none"> ▪ Risk assessments ▪ Method Statements ▪ Safe Systems of Work ▪ Permits to Work 	

	<p>1.1.3 Documentation</p> <ul style="list-style-type: none"> ▪ Organisational policy ▪ Supplier information ▪ Manufacturer’s instructions/data sheets <p>1.1.4 Signage</p> <ul style="list-style-type: none"> ▪ Information ▪ Warning ▪ Prohibition ▪ Mandatory instruction <p>1.1.7 PPE (use)</p> <ul style="list-style-type: none"> ▪ Footwear ▪ Head protection ▪ Hand gloves ▪ Protective clothing ▪ Hearing protection ▪ Eye protection ▪ Full body harness (fall arrest/fall restraint - including lanyards and inertia reels) <p>1.1.7 Full body harness:</p> <ul style="list-style-type: none"> ▪ Visual inspection of full body harness before work starts <ul style="list-style-type: none"> ○ Report faults to supervisor ○ Replace faulty with new before starting work ▪ Put on and wear correctly ▪ Use correctly to include: <ul style="list-style-type: none"> ○ Implementation of hook point ▪ How to ensure 100% tie – off <p>1.1.7 Safe manual and ergonomic handling techniques:</p> <ul style="list-style-type: none"> ▪ Moving ▪ Lifting/carrying ▪ Using hand tools ▪ Loading and unloading ▪ Bending and twisting ▪ Stacking
1.2 BE ABLE TO ASSESS THE WORKPLACE FOR	1. Identify unsafe situations / conditions and take remedial actions

<p>HAZARDS AND IDENTIFY REMEDIAL ACTIONS IN ACCORDANCE WITH HEALTH AND SAFETY LEGISLATION AND POLICY</p>	<p>2. Assess the workplace and revise work practices to account for hazards that could cause harm</p> <p>3. Undertake health and safety monitoring and reporting</p> <p>Range</p> <p>1.2.1 Hazards</p> <ul style="list-style-type: none"> ▪ Material hazards (including chemical) ▪ Tool hazards ▪ Equipment hazards ▪ Machinery/plant hazards <p>1.2.3 Monitoring and reporting:</p> <ul style="list-style-type: none"> ▪ Formal/ informal ▪ Compliant/non-compliant ▪ Verbal ▪ Written <ul style="list-style-type: none"> ○ Safety inspection report ○ Safety checklist ○ Incident/ Accidental reports
<p>1.3 BE ABLE TO APPLY RELEVANT ENVIRONMENTAL LEGISLATION AND PROCEDURES THAT RELATE TO THE WORKPLACE</p>	<p>1. Comply with relevant workplace Environmental procedures and obligations as defined by current legislation and procedures</p> <p>Range</p> <p>1.3.1 Current legislation:</p> <ul style="list-style-type: none"> ▪ Environment Order 2009 ▪ Environment Protection and Management Order 2015
<p>1.4 BE ABLE TO ASSESS THE MATERIALS FOR DEFECT AND IDENTIFY REMEDIAL ACTIONS</p>	<p>1. Undertake Quality Defect monitoring and reporting</p> <p>Range</p> <p>1.4.1 Quality Defect</p> <p>1.4.1 Monitoring and reporting:</p> <ul style="list-style-type: none"> ▪ Compliant/non-compliant ▪ Written <ul style="list-style-type: none"> ○ Specification ○ inspection report ○ Checklist

Duty	2. Understand Welding Technology and Inspection
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Competence	Performance Criteria
<p>2.1 UNDERSTAND THE CORRECT USE OF OXY-ACETYLENE AND PLASMA CUTTING EQUIPMENT AND SUPPLIES</p>	<ol style="list-style-type: none"> 1. Describe the principles involved with oxy-acetylene gas cutting processes 2. Identify oxy-acetylene gas cutting equipment 3. Describe the advantages and limitations of oxy-acetylene gas cutting processes 4. Describe the procedures for the oxy-acetylene gas cutting process 5. Describe cutting variables that affect the quality of the cutting process 6. Describe the components of machine cutting equipment 7. Identify cutting defect causes <p>Range</p> <p>2.1.1 Principles:</p> <ul style="list-style-type: none"> ▪ Rapid oxidising ▪ Flame ▪ Pressure ▪ Ignition temperature <p>2.1.2 Equipment:</p> <ul style="list-style-type: none"> ▪ Cylinders (oxygen and acetylene) ▪ Regulators and gauges (oxygen and acetylene) ▪ Flash back arrestors ▪ Hoses and fitting ▪ Check valve ▪ Cutting torch ▪ Tip or nozzle ▪ Spark lighter ▪ Nozzle cleaner ▪ Machine cutting <p>2.1.3 Advantages:</p> <ul style="list-style-type: none"> ▪ Low capital cost ▪ No electrical requirements ▪ Consumable costs low ▪ Can be used manually or mechanised ▪ Transportable ▪ Can be used to cut thick sections ▪ Can be used in all positions

	<p>2.1.3 Limitations:</p> <ul style="list-style-type: none"> ▪ Primarily limited to mild and low alloy steels ▪ Less suitable for stainless steels and aluminium ▪ Wide HAZ ▪ Quality influenced by torch nozzle and plate surface condition <p>2.1.4 Procedures:</p> <ul style="list-style-type: none"> ▪ Clean metal ▪ Pre heat and post heat temperature ▪ Flame distance ▪ Torch position ▪ Travel speed <p>2.1.5 Cutting variables:</p> <ul style="list-style-type: none"> ▪ Tip angle ▪ Amount of preheat ▪ Amount of cutting oxygen pressure ▪ Rate of travel ▪ Direction of travel <p>2.1.6 Components:</p> <ul style="list-style-type: none"> ▪ Trail ▪ Wheels ▪ Speed switch ▪ Forward, reverse and free switch ▪ Distance adjustment ▪ Acetylene valve ▪ Oxygen valve ▪ Ignition valve <p>2.1.7 Causes:</p> <ul style="list-style-type: none"> ▪ Incorrect travel speed ▪ Incorrect oxygen pressure ▪ Incorrect torch position ▪ Incorrect preheat
<p>2.2 UNDERSTAND THE CORRECT USE OF PLASMA CUTTING EQUIPMENT AND SUPPLIES</p>	<ol style="list-style-type: none"> 1. Describe the principles of plasma arc cutting 2. Identify the main types of plasma arc cutting processes 3. Identify plasma arc cutting equipment 4. Identify the components forming plasma arc cutting equipment 5. Describe gas composition for plasma cutting processes

6. Describe the ***fundamental process*** of plasma cutting
7. Explain the importance of variables with regards to the ability to make a good quality cut using plasma arc cutting processes
8. Describe ***advantages*** and ***limitations*** of plasma cutting
9. Explain the difference between plasma arc cutting processes and oxy-acetylene cutting processes
10. Identify plasma arc cutting defects

Range

2.2.2 Types:

- Dual gas
- Water injection
- Water shroud
- Air plasma
- High tolerance plasma

2.2.4 Components:

- Power Supply
- Plasma Torch
- Electrode
- Nozzle
- Shield Gas

2.2.5 Gas composition:

- Plasma arc cutting gas selection
- Shielding gas selection

2.2.6 Fundamental process:

- Current
- Shield Gas
- Direction
- Height Control
- Travel Speed
- Arc Starting

2.2.8 Advantages:

- Wide range of materials including stainless steel and aluminium Narrow HAZ
- Low consumable (air) costs
- Ideal for this sheet material
- Low fume when cutting underwater

	<ul style="list-style-type: none"> ▪ High quality cut edge (HTPAC) <p>2.2.8 Limitations:</p> <ul style="list-style-type: none"> ▪ Typically limited to 50mm (air-plasma) plate ▪ Noise when cutting thick sections ▪ Fumes when cutting in air ▪ Arc glare when cutting in air ▪ Consumables (electrode and nozzle) costs
<p>2.3 UNDERSTAND THE SHIELDED METAL ARC WELDING PROCESS (SMAW)</p>	<ol style="list-style-type: none"> 1. Explain the shielded metal arc welding (SMAW) process and the basic requirements for welding using it 2. Describe typical power sources used in SMAW and their parameters 3. Describe the function, classification, selection and care of the SMAW welding consumables 4. Describe SMAW techniques 5. Describe appropriate joint types for welds 6. Describe methods of welding joint preparation 7. Identify weld defects in SMAW and their possible causes 8. Describe visual inspection acceptance criteria for welds <p>Range</p> <p>2.3.1 Requirements:</p> <ul style="list-style-type: none"> ▪ Power sources ▪ Welding lead and electrode holder ▪ Welding return cable and clamp ▪ Welding earth <p>2.3.2 Power source:</p> <ul style="list-style-type: none"> ▪ DC generator ▪ AC/DC transformer-rectifier ▪ AC transformer ▪ Inverters <p>2.3.2 Parameters:</p> <ul style="list-style-type: none"> ▪ Duty cycle ▪ Maximum ampere output ▪ Voltage <p>2.3.3 Welding consumables:</p> <ul style="list-style-type: none"> ▪ Function of electrode coating ▪ Electrode specifications <ul style="list-style-type: none"> ○ Type of covering ○ Welding position ○ Electrical requirement

- Deposition rate
- Surface appearance
- Type of penetration
- Joint type
- Recovery rate

2.3.4 Techniques:

- Striking and tilting
- Weaving
- Deep penetration
- In various positions
- Electrode angles
- Current setting
- Speed
- Direction

2.3.5 Joint type:

- Butt
- Lap
- Tee
- Outside corner

2.3.6 Joint preparation:

- Machining
- Grinding
- Flame cutting
- Beveling
- Tacking
- Alignment

2.3.7 Causes:

- Current too high/too low
- Arc too long/too short
- Incorrect electrode angle
- Speed of travelling (too fast/too slow)
- Inconsistent electrode manipulation
- Defective electrode
- Too rapid cooling of deposit
- Impurities of parent metal

2.3.8 Visual inspection acceptance criteria:

- Piping inspection criteria – ASME B31.3 - Code for Pressure **Piping** - Chemical Plant and

	<p>Petroleum</p> <ul style="list-style-type: none"> ▪ Structural inspection criteria – EEMUA 158: Acceptance Criteria for Visual Inspection ▪ Undercut ▪ Shrinkage grooves and root concavity ▪ Reinforcement shape ▪ Overlap ▪ Linear misalignment
<p>2.4 UNDERSTAND GAS TUNGSTEN ARC WELDING (GTAW) PROCESS</p>	<ol style="list-style-type: none"> 1. Explain the Gas Tungsten Arc Welding (GTAW) process and its principles 2. Identify the basic requirements of GTAW welding systems 3. Describe the basic types of GTAW machines 4. Identify the parts of GTAW torch equipment 5. Describe the functions of the GTAW cables and hoses 6. Describe electrode type designations for GTAW equipment 7. Identify safety considerations when GTAW equipment 8. Identify common weld defects in GTAW welds 9. Describe visual inspection acceptance criteria for welds <p><u>Range</u></p> <p>2.4.2 Requirements:</p> <ul style="list-style-type: none"> ▪ Welding machine ▪ Welding torch ▪ Electrode ▪ Inert gas supply and controls ▪ Optional equipment: <ul style="list-style-type: none"> ○ Filler metal ○ Remote control (usually foot-pedal) ○ Water cooling equipment (for torch) <p>2.4.3 Types:</p> <ul style="list-style-type: none"> ▪ Direct current (DC) welding ▪ Alternating current (AC) welding ▪ Pulsed GTAW <p>2.4.4 Torch:</p> <ul style="list-style-type: none"> ▪ Nozzle ▪ Collet body ▪ Collet ▪ Torch body ▪ End cap O-ring

	<p>2.4.8 Defects:</p> <ul style="list-style-type: none"> ▪ Porosity ▪ Undercutting ▪ Lack of penetration, Cold lap, Tungsten inclusion <p>2.4.9 Visual inspection acceptance criteria:</p> <ul style="list-style-type: none"> ▪ Piping inspection criteria – ASME B31.3 - Code for Pressure Piping - Chemical Plant and Petroleum ▪ Structural inspection criteria – EEMUA 158: Acceptance Criteria for Visual Inspection ▪ Undercut ▪ Shrinkage grooves and root concavity ▪ Reinforcement shape ▪ Overlap ▪ Linear misalignment
<p>2.5 UNDERSTAND THERMAL GOUGING PROCESSES</p>	<ol style="list-style-type: none"> 1. Describe the principles of thermal gouging processes 2. Describe the use and application of gouging processes 3. Identify the equipment and components used in gouging processes 4. Describe the advantages and disadvantages of the gouging process <p>Range</p> <p>2.5.1 Gouging processes:</p> <ul style="list-style-type: none"> ▪ Plasma gouging ▪ Arc gouging

Duty	3. Practice Welding Fabrication
Competence	Performance Criteria
<p>3.1 BE ABLE TO RECOGNISE AND USE MEASURING EQUIPMENT TO COMPLETE ENGINEERING TASKS</p>	<ol style="list-style-type: none"> 1. Describe appropriate measuring equipment and systems used for engineering tasks 2. Select appropriate measurement instruments/tools used for engineering tasks 3. Perform accurate measurement and readings of engineering objects / materials <p>Range</p> <p>3.1.1 Measuring equipment and systems:</p> <ul style="list-style-type: none"> ▪ Metric ▪ Imperial ▪ Applications ▪ Standard procedures ▪ Limitations

	<p>3.1.2 Measurement instruments/tools:</p> <ul style="list-style-type: none"> ▪ Measuring tape ▪ Steel rule ▪ Outside micrometre (0 – 100 mm) ▪ Inside micrometre (0 – 100 mm) ▪ Bore gauge (12 – 100 mm) ▪ Vernier calliper (0.05 – 300 mm and/or 1/128” to 12”) ▪ Feeler gauge (metric) - accuracy 0.05mm ▪ Taper gauge (metric) ▪ Thread gauge (metric, unified and whitworth) ▪ Vernier height gauge ▪ Dial indicator (5 and 10mm travel) ▪ Inside and outside calliper - 8” ▪ Engineering square - 6” ▪ Depth gauge ▪ Welding gauge ▪ Go/No-go gauge <p>3.1.3 Measurement:</p> <ul style="list-style-type: none"> ▪ Length ▪ Width/breadth ▪ Diameter ▪ Depth ▪ Height
<p>3.2 BE ABLE TO RECOGNISE AND USE APPROPRIATE ENGINEERING HAND TOOLS</p>	<ol style="list-style-type: none"> 1. Identify typical hand tools used in engineering operations 2. Select appropriate hand tools for defined engineering operations 3. Perform engineering operations using appropriate hand tools to defined specifications 4. Demonstrate appropriate maintenance and storage of hand tools in accordance with organisational procedures <p><u>Range</u></p> <p>3.2.1 Hand tools:</p> <ul style="list-style-type: none"> ▪ Hacksaws ▪ Files ▪ Hammer ▪ Mallet ▪ Cold chisel

	<ul style="list-style-type: none"> ▪ Scrapers ▪ Hand reamers ▪ Tap and dies ▪ Wrenches (adjustable, open ended, combination, socket) ▪ Pliers (combination, slip-jaw, side cutters, snipe nose) ▪ Clamps/vices ▪ Vee blocks ▪ Centre punch ▪ Protractor ▪ Stencils ▪ Callipers <p>3.2.2 Engineering operations</p> <ul style="list-style-type: none"> ▪ Cutting ▪ Shaping ▪ Forming ▪ Joining <p>3.2.4 Maintenance and storage:</p> <ul style="list-style-type: none"> ▪ Tool inspection ▪ Tool cleaning ▪ Tool storage ▪ Tool repair/maintenance ▪ Reporting damaged/unserviceable/lost tools (Before use, during use and after use)
<p>3.3 BE ABLE TO RECOGNISE AND USE EQUIPMENT TO COMPLETE ENGINEERING LAYOUT PROCEDURES</p>	<ol style="list-style-type: none"> 1. Identify equipment used in layout marking procedures 2. Perform engineering layout marking procedures <p><u>Range</u></p> <p>3.3.1 Equipment</p> <ul style="list-style-type: none"> ▪ Marking Dye ▪ Scribes ▪ Surface Table ▪ Parallel Bars ▪ Angle Plate ▪ Vee Blocks ▪ Engineer’s Square ▪ Combination Sets ▪ Surface Gauge ▪ Vernier Height Gauge ▪ Dividers and Trammels ▪ Callipers (Dividers, Odd Leg) ▪ Steel Rule ▪ Centre Punch ▪ Letter / Number Punch

	<ul style="list-style-type: none"> ▪ Surface Comparator <p>3.3.2 Layout marking</p> <ul style="list-style-type: none"> ▪ Datum and Edges ▪ Co-ordinates ▪ Rectangular Co-ordinates
<p>3.4 BE ABLE TO RECOGNISE AND USE HAND-HELD POWER TOOLS FOR ENGINEERING OPERATIONS</p>	<ol style="list-style-type: none"> 1. Identify typical power tools used in engineering operations 2. Select appropriate power tools for defined engineering operations 3. Perform engineering operations using appropriate power tools 4. Demonstrate appropriate maintenance and storage of hand tools in accordance with organisational procedures <p>Range</p> <p>3.4.1 Power tools:</p> <ul style="list-style-type: none"> ▪ Jig Saw ▪ Hand Drill ▪ Electric Drill ▪ Hand Grinder ▪ Offhand Grinder <p>3.4.3 Engineering operations:</p> <ul style="list-style-type: none"> ▪ which may include: <ul style="list-style-type: none"> ○ clamping ○ alignment ▪ adjustment to produce desired outcomes of: <ul style="list-style-type: none"> ○ finish ○ size ○ shape <p>3.4.4 Maintenance and storage:</p> <ul style="list-style-type: none"> ▪ Power tool inspection ▪ Power tool cleaning ▪ Power tool storage ▪ Power tool repair/maintenance ▪ Reporting damaged/unserviceable/lost tools (Before use, during use and after use)
<p>3.5 BE ABLE TO RECOGNISE AND USE POWER SAWS FOR ENGINEERING OPERATIONS</p>	<ol style="list-style-type: none"> 1. Identify types of power saws and their uses 2. Identify key parts of a power saw 3. Describe the safety precautions required for power saw operation 4. Perform inspection of power saws for safe use and operation

5. Select and fit suitable **power saw blades** for engineering applications
6. Describe the advantages and limitations of different types of power saws
7. Perform **cutting operations** using power saws

Range

3.5.1 Power saws:

- Power hacksaw
- Horizontal bandsaw
- Vertical bandsaw

Uses:

- Notching
- Slotting and splitting
- Radius cutting
- Angular cutting
- Parting-off

3.5.2 Key parts:

- Worktable
- Vice
- Blade guide
- Blade tensioner
- Blade guard

3.5.3 Safety precautions:

- Use of personal protective equipment (PPE)
- Fitting and use of guards
- Emergency stop
- Appropriate training
- Suitable clamping/vice fitment

3.5.5 Power saw blades:

- Blade width
- Gauge
- Pitch
- Kerf
- Tooth form

3.5.7 Cutting operations:

- Accounting for material profile
 - Round bar
 - Flat bar
 - Square bar
 - Hexagonal bar
 - Section

	<ul style="list-style-type: none"> ▪ Stock length ▪ Speed ▪ Feed ▪ Material type ▪ Blade
3.6 BE ABLE TO INTERPRET AND USE ENGINEERING DRAWINGS AND SKETCHES	<ol style="list-style-type: none"> 1. Interpret drawings and sketches to complete engineering tasks 2. Interpret welding symbol information for use in engineering operations <p>Range</p> <p>3.6.1 Drawings and sketches:</p> <ul style="list-style-type: none"> ▪ Drawing and sketch interpretation: <ul style="list-style-type: none"> ○ View type ○ Block ○ Notes ○ Version control ○ Drawing/material/parts list ○ Dimensions and tolerance (US customary and SI metric units) ○ Terms and definitions <p>3.6.2 Welding symbols:</p> <ul style="list-style-type: none"> ▪ Symbols and standards ▪ Related terms and definitions

Duty	4. Perform Oxy-Fuel Gas Cutting
Competence	Performance Criteria
4.1 BE ABLE TO CUT METAL USING OXY-FUEL GAS CUTTING PROCESSES	<ol style="list-style-type: none"> 1. Demonstrate the correct procedures in assembling and checking oxy-fuel gas cutting equipment 2. Demonstrate the correct processes and adjustments for the lighting and shutting down of oxy-fuel gas cutting equipment 3. Perform appropriate methods of oxy-fuel gas cutting using manual equipment 4. Perform appropriate methods of oxy-fuel gas cutting using automatic equipment <p>Range</p> <p>4.1.1 Procedures:</p> <ul style="list-style-type: none"> ▪ Handling and storage of gas cylinders ▪ Connecting regulators, hoses and valves ▪ Connecting torch and associated fittings ▪ Cracking method

	<ul style="list-style-type: none"> ▪ Leaking testing <p>4.1.2 Processes and adjustment:</p> <ul style="list-style-type: none"> ▪ Setting regulator to appropriate working gas pressure ▪ Setting cutting torch to correct gas pressure ▪ Adjustment of the oxy-fuel gas cutting flame ▪ Produce correct oxy-fuel gas neutral preheating flames <p>4.1.3 Methods</p> <ul style="list-style-type: none"> ▪ Straight cut ▪ Bevelled cut ▪ Circular cut ▪ Pipe cutting <p>4.1.4 Methods</p> <ul style="list-style-type: none"> ▪ Straight cut ▪ Bevelled cut
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Duty	5. Perform Shielded Metal Arc Welding (SMAW)
Competence	Performance Criteria
5.1 BE ABLE TO JOIN METAL USING SHIELDED METAL ARC WELDING (SMAW) PROCESSES	<ol style="list-style-type: none"> 1. Demonstrate appropriate assembly and checks of SMAW equipment to complete welding processes 2. Demonstrate requirements of metal weld preparation prior to final welding taking place 3. Perform appropriate methods to strike an arc 4. Produce welded beads in all positions 5. Produce welded joints to defined industry standards in all positions <p><u>Range</u></p> <p>5.1.1 Assembly and checks:</p> <ul style="list-style-type: none"> ▪ Input power ▪ Output power ▪ Electrodes ▪ Workpiece leads ▪ Equipment condition ▪ AC/DC current setting ▪ Polarity <p>5.1.2 Requirements:</p>

	<ul style="list-style-type: none"> ▪ Cleaning ▪ Alignment ▪ Groove joint ▪ Groove angle ▪ Groove dimensions ▪ Tack weld <p>5.1.3 Methods:</p> <ul style="list-style-type: none"> ▪ Glancing/scratching motion ▪ Straight up-and-down/pecking motion <p>5.1.4 Weld beads:</p> <ul style="list-style-type: none"> ▪ Stringer bead ▪ Running bead ▪ Weaving bead ▪ Drag welded bead <p>5.1.5 Welded joints:</p> <ul style="list-style-type: none"> ▪ Fillet weld (1F, 2F, 3F, 4F) ▪ Plate weld joint (1G, 2G, 3G, 4G) ▪ Pipe butt joint (1G, 2G, 5G, 6G) ▪ Cleaning the weld ▪ Reading the bead
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Duty	6. Perform Gas Tungsten Arc Welding (GTAW)
Competence	Performance Criteria
6.1 BE ABLE TO JOIN METAL USING GAS TUNGSTEN ARC WELDING (GTAW) PROCESSES	<ol style="list-style-type: none"> 1. Demonstrate appropriate assembly and checks of GTAW equipment to complete welding processes 2. Demonstrate requirements of electrode preparation prior to final welding taking place 3. Demonstrate requirements for adjusting shielding 4. Demonstrate requirements for establishing and setting of correct current for type of metal to be welded 5. Produce welded beads in all positions 6. Produce welded joints to defined industry standards in all positions 7. Carry out tests on welded joints <p><u>Range</u></p> <p>6.1.1 Assembly and checks:</p> <ul style="list-style-type: none"> ▪ Input power ▪ Output power

	<ul style="list-style-type: none"> ▪ Drive mechanism ▪ Pressure ▪ Alignment ▪ Equipment condition <p>6.1.2 Requirements:</p> <ul style="list-style-type: none"> ▪ Cleaning ▪ Alignment ▪ Electrodes <p>6.1.3 Adjusting shielding</p> <ul style="list-style-type: none"> ▪ Shielding gas ▪ Flow meter ▪ Pressure ▪ Adjusting pressure <p>6.1.5 Weld beads:</p> <ul style="list-style-type: none"> ▪ Stringer bead ▪ Weaving bead ▪ Restarting the arc ▪ Cleaning the bead ▪ Reading the bead <p>6.1.6 Industry standard:</p> <ul style="list-style-type: none"> ▪ Fillet weld (1F, 2F, 3F, 4F) ▪ Plate weld joint (1G, 2G, 3G, 4G) ▪ Pipe butt joint (1G, 2G, 5G, 6G) <p>6.1.7 Tests:</p> <ul style="list-style-type: none"> ▪ Destructive tests ▪ Non-destructive tests ▪ Bend test ▪ Tensile test ▪ Dye-penetrant test
<p>6.2 BE ABLE TO JOIN CARBON STEEL USING COMBINATION WELDING PROCESSES (GTAW+SMAW)</p>	<p>1. Produce GTAW+SMAW combination welded joints</p> <p>Range:</p> <p>6.2.1 Welded joints:</p> <ul style="list-style-type: none"> ▪ Pipe butt joint (6G) – Carbon steel

PART 3 TRAINING STANDARDS

1. CURRICULUM DESIGN

The design of the curriculum needs to be based from the competency standards.

2. TRAINING DELIVERY

1. CLASS SIZE (RATIO: TRAINER VS TRAINEES)

- Ratio: Trainer vs. Trainees, Classroom and Practical
- Classroom (Theory) – 1 Trainer : 16 Trainees
- Practical – 1 Trainer : 8 Trainees

2. COURSE CONTENT

- 70% Practical, 30% Theory

3. EVALUATION

- Competence based assessment on Practical of Synoptics Assessment only (Competent & Not yet competent)
- Evaluation of competence is based on %. 80% is the minimum passing as competent

4. ASSESSMENT

- Assessment will be conducted by an assessment team comprising 1 assessor from RTO (where applicable), 1 independent external assessor from the industry and 1 verifier from the awarding body.
- The assessment team will be led by the independent external assessor.

3. TRAINING HOURS

The minimum nominal training hours is 1300.

4. TRAINERS QUALIFICATION

Training provider staff who tutor in Welding Level 3 qualification must:

- Have a valid certificate of competence with respect to the training they are conducting with at least 3 years' extensive and relevant work experience in that field or activity as qualified trainer;
- Be minimum Advanced Welder/CRA Welder (HNTEC) or higher;
- Have a valid recognised training or teaching qualification (i.e. Certificate of teaching, Train the Trainer, etc.);
- Have a valid HSE-related training certificate or equivalent experience where relevant;
- Be included within the training Organisation's training development plan or training matrix for trainers to maintain trainer competency;

- Awareness concerning the provisions of the of the Workplace Safety and Health Order, 2009 and its regulations;
- No Conflict of Interest (COI);
- Not allowed to internally certify their own Trainers.

5. ASSESSORS QUALIFICATION

Specifically, assessors must:

- Minimum of 3 years as an assessor or equivalent
- Hold an industry's recognised national assessor's award/ qualification and be a discipline expert in the areas being assessed;
- Should have a minimum qualifications and hands on experience of a training instructor/trainer;
- Training course instructor/trainer should NOT be the assessor/ verifier for the same training course being undertaken;
- NOTES:
 - Recognition of Prior Learning/Achievement will be considered;
 - Verifier is a process verifier within the training organization or a third-party verifier.

6. TOOLS, EQUIPMENT AND CONSUMABLES (MATERIALS)

All training providers are also required to provide at their training premises (including classrooms and practice grounds) facilities and equipment which must be maintained to a required standard and in full compliance with applicable laws of Brunei Darussalam and where appropriate, equipment should be routinely tested and inspected in accordance with applicable legislation and standards. This is to ensure that all training premises, facilities and equipment are safe and fit for purpose with suitable levels of hygiene in place*

*Training Standards 1-8: Aligned Requirements amongst SHENA, IBTE and MOE

TOOLS		EQUIPMENT		MATERIAL	
Description	Min. Qty	Description	Min. Qty	Description	Min. Qty
Chipping hammer	16 pcs	Manual Chain-Driven Pipe cutting machine	1 unit	Mild steel pipe 6" X 10.97 mm X 6 m Grade B Schedule 80 Diameter	10 units
Portable hand grinder	16 units	Portable single torch, automatic straight cutting machine	1 unit	Electrode LB52U E7016 2.6 mm (5 kg/box)	104 units
Clamp Pliers	16 pcs	SMAW / GTAW machine (including full accessories)	16 units	Electrode LB52-18 E7018 2.6 mm (5 kg/box)	528 units
Chisels	16 pcs	Bend Test Machine	1 unit	Disc Cutting 4"	4224 pcs

Nozzle Cleaner	16 pcs	Industrial portable radiography film Viewer	1 unit	Disc grinding 4"	2112 pcs
Wire brush	16 pcs	Fume extractor (portable)	16 units	Wire cup 4"	16 pcs
Spirit Level	2 pcs	Accessories for Welding Bay (Welding curtain)	16 units	Wire brush stainless steel	48 pcs
Inspection mirror	2 pcs	Bevelling machine	1 unit	Mild steel 4' X 8' X 6mm	2 units
Weld gauge	1 pc	Oxygen/gas cylinder (4 cyl/rack)	2 units	Mild steel 4' X 8' X 10mm	7 units
Gap gauge	1 pc	Stationary/Stabilizing Oven	1 unit	Dark glass 2" X 4"	192 pcs
Vernier Calliper	2 pcs	Portable oven	16 units	Clear glass 2" X 4"	1152 pcs
Flat files	10 pcs			Oxygen (O2) 7.2 M3, 240 CU FT Cylinder refill	32 units
Half round files	10 pcs			Acetylene (C2H2) 5.5 M3, Cylinder refill	16 units
Ball Pein hammer, 12 lbs	10 pcs				
Measuring tape (5m)	6 pcs				
Try Square	10 pcs				
Bench Vice	2 pcs				
Working table, 4' x 8'	1 unit				
Welding positioned	16 units				
Signage	1 unit				
Barrier tape	1 roll				
Fire extinguishers (Dry/Powder)	1 unit				
Fire extinguishers CO2	1 unit				

7. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Where required, the personal protective equipment (PPE) requirements shall be ascertained and to ensure that each candidate is provided with the same for the duration of the training course. The PPE shall be applicable for the type of course, of suitable standard and be well maintained at all times.

PPE		
Description	Qty	Standards and Specifications
Safety boots (laced) brown/black	16 pairs	BS EN ISO 20345 AS/NZS 2210 ASTM F2413
Safety glasses	16 pairs	BS EN 166 AS/NZS 1337
Welding helmet (clear glass)	16 pcs	BS EN 166
1-piece fire retardant coverall (dark Blue/Navy blue) including head scarf	2 x 16 pcs	BS EN 12477 BS EN 407 AS/NZS 2161.4 ANSI/ISEA 105
Welding gloves (leather)	16 pairs	BS EN 12477 BS EN 407 AS/NZS 2161.4 ANSI/ISEA 105
Welding apron (leather) (Body and sleeves)	16 pcs	BS EN ISO 11611
Welding sleeves (leather)	16 pcs	
Ear plug	32 pcs	EN 352 AS/NZS 1270 (Class 5)

8. TRAINING FACILITIES

- Classroom
 - Size : minimum 27m sq.

- Workshop and training grounds
 - Size : where workshop and training grounds minimum size or area is specified;
 - Proper signages.

- Basic amenities
 - Basic necessities (not limited to. *surau (male and female) toilet (male and female), resting areas, male and female changing room, first aid, etc.) must be provided;*

NO. OF TRAINEES:	16	
REQUIREMENT SIZE IN:	MIN. SIZE IN METERS (M)	MIN. REQUIREMENT SIZE IN SQ. METERS
Building (Permanent)	As approved by ABCi	As approved by ABCi
Trainee working space	2 (l) x 2 (b) x 10 (h)	-
Store room	-	20
Class Room	-	27
GRAND TOTAL IN SQ. METERS:	51	

A**ASSESSOR**

accredited individual authorized to evaluate or assess competencies of a candidate applying for certification.

D**DUTY**

the tasks to be performed by an individual as a regular part of the individual's job.

I**INSTITUTIONAL ASSESSMENT**

an assessment undertaken by the institution for its trainees to determine their achievement of the learning outcomes in the module of instructions in given unit of competency or clusters of competencies.

L**LEARNING OUTCOMES**

the set of knowledge, skills and/or competencies an individual has acquired and/or is able to demonstrate after completion of a learning process, either formal, non-formal or informal.

O**OCCUPATION**

a set of jobs whose main tasks and duties are characterized by a high degree of similarity.

P

PERFORMANCE CRITERIA

evaluative statements that specify what is to be assessed and the required level of performance or competency.

R

RECOGNITION OF PRIOR LEARNING (RPL)

the process in which the individual's previous learning outside the formal system which contributes to the achievement of current competency/ies can be assessed against the relevant unit of competency and given recognition through the issuance of appropriate certificate.

T

TASK

a discrete, assignable unit of work that has an identifiable beginning and end, containing two or more steps which when performed, leads to a product, service or decision. This is normally performed within a specified period of time.

TRAINING STANDARDS

the information and important requirements to consider when designing training programs corresponding to a national qualification; this includes information on curriculum design, training delivery, trainee entry requirements, training tools and equipment, and trainer qualifications.

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