



**COMPETENCY STANDARD
FOR
Mechanical Maintenance**

Level: 1

(Ceramic Sector)

Competency Standard Code: CS-CER-MM-L1-EN-V1



**National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh**

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This Competency Standard for Automotive Body Painting is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been developed by NSDA in association with Light Engineering Sector, industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this standard for activities benefitting Bangladesh.

Introduction

The NSDA aims to enhance an individual's employability by certifying completeness with skills. NSDA works to expand the skilling capacity of identified public and private training providers qualitatively and quantitatively. It also aims to establish and operationalize a responsive skill ecosystem and delivery mechanism through a combination of Well-defined set of mechanisms and necessary technical supports.

Key priority economic growth sectors identified by the government have been targeted by NSDA to improve current job skills along with existing workforce to ensure required skills to industry standards. Training providers are encouraged and supported to work with industry to address identified skills and knowledge to enable industry growth and increased employment through the provision of market responsive inclusive skills training program. "**Automotive Body Painting** " is selected as one of the priority occupations of **Light Engineering** Sector. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils , employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills training. Trainees who successfully pass the assessment will receive a qualification in the National Skills Qualification Framework (NSQF) and will be listed on the NSDA's online portal.

This competency standard is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements. A series of stakeholder consultations, workshops were held to develop this document.

The document also details the format, sequencing, wording and layout of the Competency Standard for an occupation which is comprised of Units of Competence and its corresponding Elements.

Overview

A **competency standard** is a written specification of the knowledge, skills and attitudes required for the performance of an occupation, trade or job corresponding to the industry standard of performance required in the workplace.

The purpose of a competency standards is to:

- provide a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials
- enable industry recognised qualifications to be awarded through direct assessment of workplace competencies
- encourage the development and delivery of flexible training which suits individual and industry requirements
- encourage learning and assessment in a work-related environment which leads to verifiable workplace outcomes

Competency standards are developed by a working group comprised of representative from NSDA, Key Institutions, ISC, and industry experts to identify the competencies required of an occupation in **light Engineering sector**.

Competency standards describe the knowledge, skills and attitude needed to perform effectively in the workplace. CS acknowledge that people can achieve technical and vocational competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.

With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.

Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of competency are documented in a standard format that comprises of:

- unit title
- nominal duration
- unit code
- unit descriptor
- elements and performance criteria
- variables and range statement
- curricular content guide
- assessment evidence guides

Together, all the parts of a unit of competency:

- describe a work activity
- guide the assessor to determine whether the candidate is competent or not yet competent

The ensuing sections of this document comprise of a description of the relevant occupation, trade or job with all the key components of a unit of competency, including:

- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

Competency Standards for National Skill Certificate – 1 in Mechanical Maintenance in Ceramic Sector

Level Descriptors of NSQF (BNQF 1-6)

Level & Job classification	Knowledge Domain	Skills Domain	Responsibility Domain
6-Mid-Level Manager/ Sub Assistant Engineer	Comprehensive actual and theoretical knowledge within a specific work or study area with an awareness of the validity and limits of that knowledge, able to analyse, compare, relate and evaluate.	Specialised and wider range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems. Communicate professional issues and solutions to the team and to external partners/users.	Work under broad guidance and self-motivation to execute strategic and operational plan/s. Lead lower-level management. Diagnose and resolve problems within and among work groups.
5-Supervisor	Broad knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to scrutinize and break information into parts by identifying motives or causes.	Broad range of cognitive and practical skills required to generate solutions to specific problems in one or more work or study areas. Communicate practice-related problems and possible solutions to external partners.	Work under guidance of management and self-direction to resolve specific issues. Lead and take responsibility for the work and actions of group/team members. Bridge between management.
4-Highly Skilled Worker	Broader knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to solve problems to new situations by comparing and applying acquired knowledge.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information. Communicate using technical terminology and IT technology with partners and users as per workplace requirements.	Work under minimal supervision in specific contexts in response to workplace requirements. Resolve technical issues in response to workplace requirements and lead/guide a team/ group.
3-Skilled Worker	Moderately broad knowledge in a specific work or study area, able to perceive ideas and abstract from drawing and design according to workplace requirements.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools. Communicate with his team and limited external partners upholding the values, nature and culture of the workplace	Work or study under supervision with considerable autonomy. Participate in teams and responsible for group coordination.
2-Semi Skilled Worker	Basic understanding of underpinning knowledge in a specific work or study area, able to interpret and apply common occupational terms and instructions.	Skills required to carry out simple tasks, communicate with his team in the workplace presenting and discussing results of his work with required clarity.	Work or study under supervision in a structured context with limited scope of manipulation
1 –Basic Skilled Worker	Elementary understanding of ability to interpret the underpinning knowledge in a specific study area, able to interpret common occupational terms and instructions.	Specific Basic skills required to carry out simple tasks. Interpret occupational terms and present the results of own work within guided work environment/ under supervision.	Work under direct supervision in a structured context with limited range of responsibilities.

List of Abbreviations

CS	- Competency Standard
ISC	- Industry Skills Council
FPS	- Foot, Pound, Second
LEISC	- Light Engineering Industry Skills Councils
NSDA	- National Skills Development Authority
MKS	- Meter, Kilogram, Second
NSQF	- National Qualifications Framework
OSH	- Occupational Safety and Health
PPE	- Personal Protective Equipment
SCVC	- Standards and Curriculum Validation Committee
STP	- Skills Training Provider
SOP	- Standard Operating Procedure
UoC	- Unit of Competency

Approved by

---th Executive Committee (EC) Meeting of NSDA

Held on -----

Deputy Director (Admin)
and
Officer of Secretarial Duties for EC meeting
National Skills Development Authority

**National Competency Standards for National Skill Certificate, Level –1 in
Mechanical Maintenance for Ceramic Industries**

Course Structure

SL	Unit Code and Title		UoC Level	Nominal Hours
Generic Competencies				40
1.	GU001L1V1	Perform computations using basic mathematical concepts	1	15
2.	GU002L1V1	Apply OSH practices at the workplace	1	15
3.	GU013L2V1	Practice housekeeping procedure	1	10
Sector Specific Competencies				60
4.	SU-CER-01-L1-V1	Work in the Ceramic Sector	1	20
5.	SU-CER-02-L1-V1	Use Measuring and Checking Tools and Instruments	1	40
Occupation Specific Competencies				260
6.	OU-CER-MM-01-L1-V1	Use Mechanical Hand Tools and Power Tools	1	50
7.	OU-CER-MM-02-L1-V1	Interpret Technical Drawing	1	20
8.	OU-CER-MM-03-L1-V1	Perform Lathe Machine Operations	1	90
9.	OU-CER-MM-04-L1-V1	Perform Gas and Plasma Cutting	1	30
10.	OU-CER-MM-05-L1-V1	Perform Shielded Metal Arc Welding (SMAW)	1	70
Total Nominal Learning Hours				360

Units & Elements at a Glance:

Generic Competencies (40 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU001L2V1	Perform computations using basic mathematical concept	<ol style="list-style-type: none"> 1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods for the calculation 	15
GU002L2V1	Apply OSH procedure in the workplace	<ol style="list-style-type: none"> 1. Use tool/instrument to perform calculations 2. Identify OSH policies and procedures. 3. Follow OSH procedure 4. Report hazards and risks 5. Respond to emergencies 6. Maintain personal Well-being 	15
GU013L2V1	Practice housekeeping procedure	<ol style="list-style-type: none"> 1. Sort and remove unnecessary items 2. Arrange items 3. Maintain work area, tools and equipment 4. Follow standardized work process and procedures 5. Perform work spontaneously 	10
Total Hour			40

Sector Specific Competencies (60 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SU-CER-01-L1-V1	Work in the Ceramic Sector	<ol style="list-style-type: none"> 1. Identify job roles and responsibilities 2. Identify and observe OSH 3. Plan work activities 4. Work with others 	20
SU-CER-02-L1-V1	Use Measuring and Checking Tools and Instruments	<ol style="list-style-type: none"> 1. Prepare for work 2. Select the job to be measured and checked 3. Select measuring and checking tools and instruments 4. Take and check measurements 5. Measurements are recorded and communicated 6. Clean and store measuring and checking instruments 	40
Total Hours			60

Occupation Specific Competencies (260 Hours)

Code	Unit of Competency	Elements of Competency	Hours
OU-CER-MM-01-L1-V1	Use Hand Tools and Power Tools	<ol style="list-style-type: none"> 1. Prepare for work 2. Use Manual tools 3. Use power tools 4. Maintain cleanliness and store hand and power tools 	50
OU-CER-MM-02-L1-V1	Interpret Technical Schematic Drawing	<ol style="list-style-type: none"> 1. Follow OSH 2. Select drawing 3. Interpret drawing 	20
OU-CER-MM-03-L1-V1	Perform Lathe Machine Operations	<ol style="list-style-type: none"> 1. Prepare for lathe operation 2. Determine job requirements 3. Setup workpiece 4. Perform turning operation of workpiece using lathe machine 5. Maintain cleanliness and store tools and equipment 	90
OU-CER-MM-04-L1-V1	Perform Gas and Plasma Cutting	<ol style="list-style-type: none"> 1. Prepare for work 2. Set up equipment for cutting 3. Perform gas cutting 4. Perform plasma cutting 5. Clean and store tools & equipment 	30
OU-CER-MM-05-L1-V1	Perform Shielded Metal Arc Welding (SMAW)	<ol style="list-style-type: none"> 1. Prepare for welding work 2. Setup equipment and job for welding 3. Perform welding 4. Maintain cleanliness and store tools and equipment 	70
Total Hours			260

Generic Competencies

Unit Code and Title	GU001L1V1: Perform Computations Using Basic Mathematical Concepts
Unit Descriptor	<p>This unit of competency requires the knowledge, skills and attitude to perform computations using basic mathematical concepts in the workplace.</p> <p>It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical method/concept for the calculation and using appropriate instruments tools to perform calculation.</p>
Nominal Hours	15 Hours
Elements of Competency	Performance Criteria Bold & Underlined terms are elaborated in the Range of Variables Training Components
1. Identify calculation requirements in the workplace	1.1 Job requirements are identified 1.2 <u>Measurements</u> are selected in accordance with job requirement 1.3 Calculation requirements are identified from <u>workplace information</u>
2. Select appropriate mathematical methods for the calculation.	2.1 Mathematical methods are identified 2.2 <u>Appropriate method</u> is selected to carry out the calculation requirements 2.3 Tolerance and clearance limits are identified and adjusted according to the job requirements
3. Use tool/instrument to perform calculations	3.1 Work instructions are confirmed and applied to the job in hand 3.2 Materials to be measured are identified as per job specification 3.3 Appropriate <u>tool/ instrument</u> is selected based on materials to be measured
Range of Variables	
Variable	Range (may include but not limited to)
1. Measurements	1.1 Length 1.2 Width 1.3 Weight 1.4 Tolerance
2. workplace information	2.1 Job Order 2.2 Design 2.3 Working drawing 2.4 Verbal instructions 2.5 Written Instruction

3. Appropriate method	<ul style="list-style-type: none"> 3.1 Addition 3.2 Subtraction 3.3 Division 3.4 Multiplication 3.5 Conversion 3.6 Percentage and ratio calculation
4. Tool/ Instrument	<ul style="list-style-type: none"> 4.1 Calculator 4.2 Scale 4.3 Measuring tape 4.4 Marker
<p>Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.</p>	
1. Critical Aspects of Competency	<p>Assessment required evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Identified calculation requirements from workplace information 1.2 Selected appropriate method to carry out the calculation requirements 1.3 Selected measurements 1.4 Selected appropriate methods 1.5 Used tool/instrument 1.6 Added numbers 1.7 Subtracted numbers 1.8 Multiplied numbers. 1.9 Divided numbers. 1.10 Completed calculations using appropriate tools/instruments
2. Underpinning Knowledge	<ul style="list-style-type: none"> 2.1. Numerical concept 2.2. Basic mathematical methods such as addition, subtraction, multiplication and division and percentage. 2.3. Mathematical language, symbols and terminology. 2.4. Measuring units
3. Underpinning Skills	<ul style="list-style-type: none"> 3.1 Interpret numerical concept 3.2 Interpret mathematical methods such as addition, subtraction, multiplication and division and percentage. 3.3 Interpret mathematical language, symbols and terminology. 3.4 Interpret measuring units

4. Underpinning Attitudes	<ul style="list-style-type: none"> 4.1. Commitment to occupational health and safety 4.2. Environmental concerns 4.3. Eagerness to learn 4.4. Tidiness and timeliness 4.5. Respect for rights of peers and seniors in workplace 4.6. Communication with peers and seniors in workplace
5. Resource Implications	<ul style="list-style-type: none"> 5.1. Work place Procedure 5.2. Materials relevant to the proposed activity 5.3. All tools, equipment, material and documentation required. 5.4. Relevant specifications or work instructions
6. Methods of Assessment	<ul style="list-style-type: none"> 6.1. Written Test 6.2. Demonstration 6.3. Oral Questioning 6.4. Portfolio
7. Context of Assessment	<ul style="list-style-type: none"> 7.1. Competency assessment must be done in a NSDA accredited assessment center 7.2. Assessment should be done by an NSDA certified/nominated assessor
<p>Accreditation Requirements</p> <p>Training Providers must be accredited by NSDA, the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of national skills qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Unit Code and Title	GU002L1V1: Apply OSH Procedure in the Workplace
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required in applying OSH procedures in the workplace. It specifically includes identifying OHS policies and procedures, following OSH procedure, reporting to emergencies, and maintaining personal well-being.
Nominal Hours	15 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures.	1.1. <u>OSH policies</u> and <u>safe operating procedures</u> are accessed and stated 1.2. <u>Safety signs and symbols</u> are identified and followed 1.3. Emergency response, evacuation procedures and other contingency measures are determined according to workplace requirements
2. Follow OSH procedure	2.1 <u>Personal protective equipment (PPE)</u> is selected and collected as required 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OSH procedures and practices 2.3 A clear and tidy workplace is maintained as per workplace standard 2.4 PPE is maintained to keep them operational and compliant with OSH regulations
3. Report hazards and risks.	3.1 <u>Hazards</u> and risks are identified, assessed and controlled 3.2 Incidents arising from hazards and risks are reported to designated authority
4. Respond to emergencies	4.1 Alarms and warning devices are responded 4.2 Workplace <u>emergency procedures</u> are followed 4.3 <u>Contingency measures</u> during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures 4.4 First aid procedures is applied during emergency situations
5. Maintain personal Well-being	5.1 OSH policies and procedures are adhered to

	<p>5.2 OSH awareness programs are participated in as per workplace guidelines and procedures</p> <p>5.3 Corrective actions are implemented to correct unsafe condition in the workplace</p> <p>5.4 “Fit to work” records are updated and maintained according to workplace requirements</p>
Range of Variables	
Variables	Range (may include but not limited to):
1. OHS Policies	<p>1.1. Bangladesh standards for OHS</p> <p>1.2. Fire Safety Rules and Regulations</p> <p>1.3. Code of Practice</p> <p>1.4. Industry Guidelines</p>
2. Safe Operating Procedures	<p>2.1 Orientation on emergency exits, fire extinguishers, fire escape, etc.</p> <p>2.2 Emergency procedures</p> <p>2.3 First Aid procedures</p> <p>2.4 Tagging procedures</p> <p>2.5 Use of PPE</p> <p>2.6 Safety procedures for hazardous substances</p>
3. Safety Signs and symbols	<p>3.1 Direction signs (exit, emergency exit, etc.)</p> <p>3.2 First aid signs</p> <p>3.3 Danger Tags</p> <p>3.4 Hazard signs</p> <p>3.5 Safety tags</p> <p>3.6 Warning signs</p>
4. Personal Protective Equipment (PPE)	<p>4.1 Gas Mask</p> <p>4.2 Gloves</p> <p>4.3 Safety boots</p> <p>4.4 Face mask</p> <p>4.5 Overalls</p> <p>4.6 Goggles and safety glasses</p> <p>4.7 Sun block</p> <p>4.8 Chemical/Gas detectors</p>
5. Hazards	<p>5.1 Chemical hazards</p> <p>5.2 Biological hazards</p> <p>5.3 Physical Hazards</p> <p>5.4 Mechanical and Electrical Hazard</p> <p>5.5 Mental hazard</p> <p>5.6 Ergonomic hazard</p>
6. Emergency Procedures	<p>6.1 Fire fighting</p> <p>6.2 Earthquake</p> <p>6.3 Medical and first aid</p>

	6.4 evacuation
7. Contingency measures	7.1 Evacuation 7.2 Isolation 7.3 Decontamination
8. "Fit to Work" records	8.1 Medical Certificate every year 8.2 Accident reports, if any 8.3 Eye vision certificate
Evidence Guide	
The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 Stated OHS policies and safe operating procedures 1.2 Followed safety signs and symbols 1.3 Used personal protective equipment (PPE) 1.4 Maintained workplace clear and tidy 1.5 Assessed and Controlled hazards 1.6 Followed emergency procedures 1.7 Followed contingency measures 1.8 Implemented corrective actions
2. Underpinning knowledge	2.1 Define OHS 2.1 Define OHS 2.2 OHS Workplace Policies and Procedures 2.3 Work Safety Procedures 2.4 Emergency Procedures 2.5 Hazard control procedure 2.6 Different types of Hazards 2.7 PPE and there uses 2.8 Personal Hygiene Practices 2.9 OHS Awareness
3. Underpinning skills	3.1 Accessing OHS policies 3.1 Accessing OHS policies 3.2 Handling of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	4.1 Commitment to occupational health and safety 4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness

	4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace
5. Resource implications	5.1 Workplace 5.1 Workplace 5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, materials and documentation required 5.4 OHS Policies and Procedures
6. Methods of Assessment	Competency will be assessed by: 6.5. Written Test 6.6. Demonstration 6.7. Oral Questioning 6.8. Portfolio
7. Context of Assessment	7.3. Competency assessment must be done in a NSDA accredited assessment center 7.4. Assessment should be done by an NSDA certified/nominated assessor
<p>Accreditation Requirements</p> <p>Training Providers must be accredited by NSDA, the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of national skills qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Unit Code and Title	GU013L1V1: Practice House Keeping Procedure
Unit Descriptor	<p>This unit covers the knowledge, skills and attitude required to Practice housekeeping procedure.</p> <p>It specifically includes sorting and removing unnecessary items, arranging items, maintaining work area, tools and equipment, following standardized work process and procedure and performing work spontaneously.</p>
Nominal Hours	10 Hours
Elements of Competency	Performance Criteria <u>Bold underlined</u> terms are elaborated in the Range of Variables
1. Sort and remove unnecessary items	<p>1.1 Reusable, recyclable materials are sorted in accordance with company/office procedures</p> <p>1.2 <u>Unnecessary items</u> are removed and disposed of in accordance with company or office procedures</p>
2. Arrange items	<p>2.1 Items are arranged in accordance with company/office housekeeping procedures</p> <p>2.2 Work area is arranged according to job requirements</p> <p>2.3 Activities are prioritized based on instructions.</p> <p>2.4 Items are provided with clear and visible <u>identification marks</u> based on procedure</p> <p>2.5 Safety equipment and evacuation passages are kept clear and accessible based on instructions</p>
3. Maintain work area, tools and equipment	<p>3.1 Cleanliness and orderliness of work area is maintained in accordance with company/office procedures</p> <p>3.2 Tools and equipment are cleaned in accordance with manufacturer's instructions/manual</p> <p>3.3 <u>Minor repairs</u> are performed on tools and equipment in accordance with manufacturer's instruction/manual</p> <p>3.4 Defective tools and equipment are reported to immediate supervisor</p>
4. Follow standardized work process and procedure	<p>4.1 Materials for common use are maintained in designated area based on procedures</p> <p>4.2 Work is performed according to standard work procedures. Abnormal incidents are reported to immediate supervisor</p>
5. Perform work spontaneously	<p>5.1 Work is performed as per instruction</p> <p>5.2 Company and office <u>decorum</u> are followed and</p>

	<p>complied with</p> <p>5.3 Work is performed in accordance with OSH requirements</p>
Range of Variables	
Variable	Range (may include but not limited to):
1. Unnecessary items	<p>1.1 Non-recyclable materials</p> <p>1.2 Pictures, posters and other materials not related to work activity</p> <p>1.3 Unserviceable tools and equipment</p> <p>1.4 Waste materials</p>
2. Identification marks	<p>2.1 Color coding</p> <p>2.2 Labels</p> <p>2.3 Tags</p>
3. Minor repairs	<p>3.1 Application of lubricants</p> <p>3.2 Replacement of parts</p> <p>3.3 Sharpening of tools</p> <p>3.4 Tightening of nuts, bolts and screws</p>
4. Decorum	<p>4.1 Behavior</p> <p>4.2 Company/office rules and regulations</p> <p>4.3 Company/office uniform</p>
Evidence Guide	
<p>The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.</p>	
1. Critical aspects of competency	<p>1.1 Sorted and removes unnecessary items</p> <p>1.2 Arranged items</p> <p>1.3 Maintained work area, tools and equipment</p> <p>1.4 Followed standardized work process and procedures</p> <p>1.5 Performed work spontaneously</p>
2. Underpinning knowledge	<p>2.1 Environmental requirements relative to work safety</p> <p>2.2 Principles of 5S</p> <p>2.3 Reading skills required to interpret instructions</p> <p>2.4 Work process and procedures</p> <p>2.5 Work-related documentation requirements</p>
3. Underpinning skills	<p>3.1 Arranging items</p> <p>3.2 Maintaining work area, tools and equipment</p> <p>3.3 Following standardizing work process</p>

4. Underpinning attitude	<ul style="list-style-type: none"> 1.1 Commitment to occupational health and safety 1.2 Promptness in carrying out activities 1.3 Sincere and honest to duties 1.4 Environmental concerns 1.5 Eagerness to learn 1.6 Tidiness and timeliness 1.7 Respect for rights of peers and seniors in workplace 1.8 Communication with peers and seniors in workplace
2. Resource implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 5.1 Work place Procedure 5.2 Materials relevant to the proposed activity 5.3 All tools, equipment, material and documentation required. 5.4 Relevant specifications or work instructions
6. Methods of assessment	<p>Methods of assessment may include but not limited to:</p> <ul style="list-style-type: none"> 3.1 Written test 3.2 Demonstration 3.3 Oral questioning 3.4 Portfolio
4. Context of assessment	<ul style="list-style-type: none"> 7.1 Competency assessment must be done in a training center or in an actual or simulated work place after Completion of the training module 7.2 Assessment should be done by NSDA certified assessor
<p>Accreditation Requirements</p> <p>Training Providers must be accredited by NSDA, the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of national skills qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Sector Specific Competencies

Unit Code and Title	SU-CER-01-L1-V1: Work in the Ceramic Sector
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to work in the Ceramic Industry. It specifically includes the tasks of identifying job roles and responsibilities, identifying and observing OSH in the manufacturing industries, planning work activities and working with others.
Nominal Hours	20 Hours
Elements of Competency	Performance Criteria <u>Bold and Underlined</u> terms are elaborated in the Range of Variables
1. Identify job roles and responsibilities;	1.1 Job roles and responsibilities in the manufacturing industry are identified; 1.2 Relationship within the manufacturing industry employees is identified;
2. Identify and observe OSH in the manufacturing industries;	2.1. OSH in the manufacturing industries is identified and observed; 2.2. Safe work practices are followed when using equipment in the work environment;
3. Plan work activities;	3.1 Common goals, objectives and tasks are identified and clarified with appropriate persons; 3.2 Individual tasks are determined and agreed on according to workplace environment;
4. Work with others;	4.1 <u>Effective interpersonal skills</u> are applied to interact with others and to contribute to activities and objectives; 4.2 Assigned tasks are performed in accordance with job requirements, specifications and workplace environment; 4.3 <u>Work requirements</u> are confirmed with colleagues;
Range of Variables	
Variable	Range (may include but not limited to):
1. Effective interpersonal skills	1.1 Basic listening and speaking skills, use terminology and jargon 1.2 Communication and receiving feedback 1.3 Interpretation of instructions 1.4 Basic principles of effective communication
2. Work requirements	2.1 Work requirements as directed in verbal or written in specifications or procedures;
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency	

1. Critical Aspects of Competency	<ul style="list-style-type: none"> 1. 1 Followed job role accordance with industries requirement. 1. 2 Developed relationship with industries fellow 1. 3 Identified different types of Hazards 1. 4 Used PPE 1. 5 Applied effective interpersonal skills to achieve the goals of industry.
2. Underpinning Knowledge	<ul style="list-style-type: none"> 2.1 Key duties/responsibilities of Manufacturing technician 2.2 Responsibilities of Supervisors 2.3 Responsibilities of Employers 2.4 Responsibilities of Workers 2.5 Common Hazards 2.6 Ways to reduce the risk 2.7 Common goals of the manufacturing Industry
3. Underpinning Skills	<ul style="list-style-type: none"> 3.1 Improving Employee Employer Relationships 3.2 Creating a Positive Relationship with Employees 3.3 Observing OHS in manufacturing industry 3.4 Identifying OHS policies and procedures 3.5 Following personal work safety practices 3.6 Reporting hazards and risks 3.7 Responding to emergency procedures 3.8 Maintaining physical well-being in the workplace
4. Required Attitudes	<ul style="list-style-type: none"> 4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource Implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 5.1 Workplace 5.2 Tools and equipment appropriate to workplace 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 OHS Policies and Procedures
6. Methods of Assessment	<p>Methods of assessment may include but not limited to:</p> <ul style="list-style-type: none"> 6.1 Written Test 6.2 Demonstration 6.3 Oral Questioning 6.4 Portfolio
7. Context of Assessment	<ul style="list-style-type: none"> 7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any NTVQF qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA

Unit Code and Title	SU-CER-02-L1-V1: Use Measuring and Checking Tools and Instruments
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use measuring and checking tools and instruments. It includes the tasks of preparing with OSH practices, selecting the job, selecting measuring and checking tools and instruments, taking and checking measurements, recording measurements, cleaning and storing measuring and checking instruments.
Nominal Hours	40 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the range of variables
1. Prepare for work	1.1 Safe work practices are observed and <u>Personal Protective Equipment (PPE)</u> worn as required for the work performed. 1.2 Hazards are identified and risks are minimized and controlled. 1.3 Measuring and checking tools and instruments are selected and collected for use.
2. Select the job to be measured and checked	2.1 Jobs to be measured are identified 2.2 Jobs to be checked are identified 2.3 Documents and specifications are Interpreted
3. Select measuring and checking tools and instruments	3.1 Measuring and checking instrument is selected according to job requirements 3.2 Tolerance and/or clearance, limits are interpreted from the drawing
4. Take and check measurements	4.1 Measuring and checking instruments are calibrated to ensure accurate reading/measurement 4.2 Routine adjustments are done as required 4.3 Measurements are taken precisely/accurately as per supplied drawing or manual 4.4 Measurements are checked against job requirement.
5. Measurements are recorded and communicated	5.1 Measurements are recorded on form/drawings/sketches as per company procedures 5.2 Recorded measurements are interpreted and communicated to supervisor
6. Clean and store measuring and checking instruments	6.1 Measuring and checking instruments are cleaned 6.2 Measuring instruments are stored as per industry procedure.

Range of Variables	
Variable	Range (May include but not limited to)
1. Personal Protective Equipment (PPE)	1.1 Safety shoes 1.2 Safety belt 1.3 Goggles 1.4 Hand gloves 1.5 Safety helmet 1.6 Overall apron 1.7 Safety Mask 1.8 Ear plug
2. Hazards	2.1 Physical hazard 2.2 Chemical hazard 2.3 Electrical and mechanical hazard 2.4 Biological hazard 2.5 Ergonomic hazard
3. Measuring and checking tools and instruments	3.1 Measuring tools <ul style="list-style-type: none"> ▪ Measuring tape ▪ Slide/Vernier Calipers ▪ Steel Rules ▪ Micrometer ▪ Procter ▪ Combination square set ▪ Vernier Hight gauge ▪ Depth gauge ▪ Dial indicator 3.2 Checking tools <ul style="list-style-type: none"> ▪ inside calipers ▪ outside calipers ▪ Filler gauge ▪ Thread gauge ▪ Divider ▪ Plug gauge ▪ Snap gauge ▪ Ring gauge 3.3 Measuring instruments <ul style="list-style-type: none"> ▪ Digimatic calipers ▪ Digimatic micrometer ▪ Tachometer ▪ Infrared Thermometer ▪ Air Flow meter ▪ Water Flow meter ▪ Digital Venturi meter ▪ Pressure gauge ▪ Perimeter

	<ul style="list-style-type: none"> ▪ Gloss meter ▪ Mass flow meter ▪ Stop watch ▪ Magnetic pressure gauge ▪ Lesser level
4. Documents	4.1 Drawings 4.2 Sketches 4.3 technical manuals 4.4 specifications 4.5 written instructions
5. Routine adjustment	5.1 Calibration 5.2 Simple zeroing 5.3 Scale adjustment 5.4 Reference adjustment
6. Measurements	6.1 Measuring length 6.2 Thread pitch 6.3 Angle 6.4 Diameter 6.5 Clearances 6.6 Time 6.7 Temperature 6.8 Fluid Flow 6.9 RPM/Speed 6.10 Glossing
Evidence Guide	
The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency.	
1. Critical aspects of competency	1.1 Followed OSH practices 1.2 Identified the proper graduated measuring instrument 1.3 Took measurement 1.4 Recorded measurement 1.5 Interpreted written inspection.
2. Underpinning knowledge	2.1 Relevant OSH. 2.2 Principles of using different graduated measuring instruments. 2.3 Workplace standard. 2.4 Sequence of using the instruments. 2.5 Maintaining rules of instruments. 2.6 Methods of checking for instruments 2.7 Calibration of instrument

3. Underpinning skill	3.1 Practicing workplace safety 3.2 Using PPE 3.3 Using of instruments 3.4 interpreting and following data sheet, instruction and manuals, technical drawing 3.5 Performing measurement 3.6 Checking for conformance to specification 3.7 Keeping record and report 3.8 Calibrating of instrument
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Hand tools and power tools appropriate to propose activities 5.4 Information and documentation 5.5 Manual, Codes, Standards and reference materials
6. Methods of assessment	6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor
<p>Accreditation Requirements</p> <p>Training Providers must be accredited by NSDA, the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of national skills qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Occupation Specific Competencies

Unit Code and Title	OU-CER-MM-01-L1-V1: Use Hand Tools and Power Tools
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use hand and power tools. It includes the tasks of preparing with OSH practices, using manual tools, using power tools, maintaining cleanliness and storing hand tools and power tools
Nominal Hours	50 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Prepare for work	1.1 Personal Protective Equipment (PPE) is collected and worn as per work requirement. 1.2 Occupational Safety and Health (OSH) is followed. 1.3 Appropriate hand tools are identified and collected as per requirement 1.4 Power tools are identified and collected conforming to task requirements.
2. Use Manual tools	2.1 <u>Applications</u> of tools and equipment are defined 2.2 Proper hand-eye coordination is applied in the use of hand tools 2.3 Unsafe or faulty tools are identified and marked for repair or reject 2.4 Proper Gripping of tools is followed as per instruction
3. Use power tools	3.1 Power tools are used for a specific <u>sequence of operations</u> to produce desired outcomes conforming to job specifications. 3.2 All safety requirements are compiled before, during and after use. 3.3 Unsafe or faulty tools are identified and marked for repair / reject before, during and after use according to current procedures. 3.4 <u>Operational maintenance</u> of tools is undertaken according to standard procedures.
4. Maintain cleanliness and store hand tools and power tools	4.1 Workplace is cleaned as per standard procedure 4.2 Waste materials are disposed conforming to the environmental compliances 4.3 Hand and power tools are cleaned and stored safe place as per instruction manuals.

Range of Variables	
Variables	Range (may include but not limited to):
1. Personal Protective Equipment (PPE)	1.1 Safety shoes 1.2 Goggles 1.3 Hand gloves 1.4 Apron 1.5 Helmet 1.6 Safety belt
2. Hand tools	2.1 Different types of hammers 2.2 Different type of wrenches 2.3 Different types of files 2.4 Different types of chisels 2.5 Hacksaw 2.6 Different types of punch 2.7 Scriber 2.8 Different types pliers 2.9 Tin sniper 2.10 Wire Brush 2.11 Scraper 2.12 Jigs and fixtures 2.13 C clamp (clamp) 2.14 Spanner 2.15 Allen key 2.16 Ratchet 2.17 Spirit levels 2.18 Tri-square 2.19 Hand Scissor 2.20 Wooden hammer 2.21 Plastic hammer 2.22 Multigrips 2.23 Pipe wrench 2.24 Snipper
3. Application	3.1 Adjusting 3.2 Aligning 3.3 Clamping 3.4 Cleaning 3.5 Finishing 3.6 Lubricating 3.7 Tightening

4. Power tools	4.1 Electric or pneumatic / hydraulic drills 4.2 Portable Grinders 4.3 Portable drill 4.4 Nibblers 4.5 Cutting saws 4.6 Pedestal drills 4.7 Pedestal grinders 4.8 Bench grinders 4.9 Power saws
5. Sequence of Operation	5.1 Clamping 5.2 Alignment 5.3 Adjustment 5.4 Completion of operation
6. Clamping	6.1 Jigs and fixtures 6.2 Clamps etc. 6.3 Multi grips 6.4 Different types of Vices
7. Operational maintenance	7.1 Hand sharpening 7.2 Cleaning 7.3 Lubricating 7.4 Tightening 7.5 Simple tools repair and adjustments
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 Followed proper using procedure of manual tools 1.2 Maintained safety precaution for using hand & power tools 1.3 Maintained operation procedure of power tools 1.4 Maintained sequence of operation of hand tools and power tools 1.5 Used power tools as per workplace requirement. 1.6 Determined proper sequence of operations in using tools 1.7 Undertook operational maintenance

2. Underpinning knowledge	2.1 Classification of tools. 2.2 Types of hand and power tools 2.3 Safely use of hand tools and power tools. 2.4 Working principles of hands & power tools: <ul style="list-style-type: none"> ➤ punches ➤ chisels ➤ wrenches ➤ pliers ➤ hand drill ➤ disc grinder ➤ pedestal drill ➤ powered screw driver 2.5 Preventive maintenance of hand and power tools. 2.6 Methods of using hand and power tools. 2.7 Storage procedures. 2.8 Care of tools and equipment 2.9 Operational maintenance 2.10 Sequence of operation
3. Underpinning skills	2.1 Identifying tools. 2.2 Practicing OSH 2.3 Using hand and power tools safely. 2.4 Performing preventive maintenance. 2.5 Performing cleaning and storing tools and equipment.
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Hand tools and power tools appropriate to propose activities 5.4 Information and documentation 5.5 Manual, Codes, Standards and reference materials
6. Methods of assessment	6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor
Accreditation Requirements	

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Unit Code and Title	OU-CER-MM-02-L1-V1: Interpret Technical Schematic Drawing
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to interpret technical drawing. It includes following OSH practices, selecting drawing and interpreting drawing
Nominal Hours	20 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Follow OSH	1.1 Safe work practices are observed and <u>Personal Protective Equipment (PPE)</u> worn as required for the work performed. 1.2 <u>Hazards</u> are identified and risks are minimized and controlled.
2. Select drawing	1.1 <u>Drawing</u> is selected and checked to ensure that it conforms to the job requirements. 1.2 Drawing is validated with the superior
3. Interpret drawing	1.3 Drawing components, assemblies are identified. 1.4 Dimensions are identified according to job requirement. 1.5 Clearances / tolerances and fit are checked as per workplace standard. 1.6 <u>Instructions</u> are identified and followed accurately. 1.7 Material specification are identified as per job requirement. 1.8 Symbols in drawing are interpreted.
Range of Variables	
Variable	Range (may include but not limited to):
1. PPE	1.1 Safety shoes 1.2 Overall apron 1.3 Safety Mask 1.4 Ear plug
2. Hazard	2.1 Physical hazard 2.2 Chemical hazard 2.3 Electrical and mechanical hazard 2.4 Biological hazard 2.5 Ergonomic hazard
3. Drawing	3.1 Technical drawing 3.2 Sketch
4. Instructions	4.1 Note 4.2 Special instruction 4.3 Precaution

Evidence Guide

The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.

1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 Followed OSH 1.2 Identified dimension according to job requirement 1.3 Maintained clearances and tolerances according to workplace requirement 1.4 Interpreted drawing symbols.
2. Underpinning knowledge	2.1 Occupational Safety and Health (OSH). 2.2 Methods of checking. 2.3 Limit, fit, tolerance and clearance 2.4 Dimension line, Extension line, hidden line, boarder line and centre line. 2.5 Scale ratio of drawing 2.6 Drawing information 2.7 Drawing symbol
3. Underpinning skills	3.1 Practicing workplace safety. 3.2 Reading / interpreting information on the drawing, 3.3 Following data sheet, instruction and manuals, technical drawing. 3.4 Performing measurement, calculation. 3.5 Interpreting drawing. 3.6 Perform checking. 3.7 Keeping record.
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	5.6 Adequate workplaces 5.7 Materials for proposed activities 5.8 Hand tools and power tools appropriate to propose activities 5.9 Information and documentation 5.10 Manual, Codes, Standards and reference materials
6. Methods of assessment	6.1 Workplace observation 6.2 Demonstration 6.3 Oral questioning 6.4 Written test 6.5 Portfolio

7. Context of assessment	<p>7.1 Competency assessment must be done in NSDA accredited assessment centre</p> <p>7.2 Assessment should be done by a NSDA certified/nominated assessor</p>
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Accreditation Requirements

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Unit Code and Title	OU-CER-MM-03-L1-V1: Perform Lathe Machine Operations
Unit Descriptor	<p>This unit covers the knowledge, skills and attitudes required to perform lathe operations.</p> <p>It includes the tasks of preparing for lathe operation with OSH practices, determining job requirements, setting up workpiece, performing tuning operations, maintaining cleanliness and storing tools and equipment.</p>
Nominal Hours	90 Hours
Elements of Competency	<p>Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables</p>
1. Prepare for lathe operation	<p>1.1 Safe work practices are observed and <u>Personal Protective Equipment (PPE)</u> worn as required for the work performed.</p> <p>1.2 <u>Hazards</u> are identified and risks are minimized and controlled.</p> <p>1.3 <u>Tools</u> are selected and collected as per job requirements.</p>
2. Determine job requirements	<p>2.1 <u>Routine maintenance</u> is performed to prepare the machine for required operation as per manufacturer's instruction.</p> <p>2.2 <u>Drawings</u> are interpreted to produce component to specifications.</p> <p>2.3 Sequence of operation is determined to produce component to specifications.</p> <p>2.4 <u>Cutting tools, attachment</u> are selected according to the requirements of the operation.</p>
3. Setup workpiece	<p>3.1 <u>Workpiece</u> is centered and clamped on chuck to required level of accuracy using tools and equipment in accordance with workplace procedures.</p> <p>3.2 Workpiece is setup and clamped to required level of accuracy using <u>instruments / equipment</u> according to work place procedures.</p> <p>3.3 <u>Cutting tool</u> is set up in accordance with the requirement of the operation.</p> <p>3.4 <u>Lathe accessories</u> are used as appropriate to the requirements of the operation.</p> <p>3.5 Setting up quick change gear box as per job required.</p> <p>3.6 Machine guards and coolant devices are checked according to work requirement.</p>

4. Perform turning operation of workpiece using lathe machine	<p>4.1 Speeds and feeds and depth of cut are calculated as per job requirement.</p> <p>4.2 Machine performance is checked conforming to the work requirement.</p> <p>4.3 Coolant is applied to prevent over heating of workpiece and cutting tool as per manufacturer instruction.</p> <p>4.4 <u>Lathe operations</u> are performed to produce component to specifications in the drawing.</p> <p>4.5 Workpiece is checked / measured for conformance to specification using <u>measuring tools</u> and equipment.</p>
5. Maintain cleanliness and store tools and equipment	<p>5.1 Waste materials are disposed of in accordance with environmental requirements.</p> <p>5.2 Workplace is cleaned as per standard procedure</p> <p>5.3 Tools are cleaned and stored safely in appropriate location</p>
Range of Variables	
Variable	Range (may include but not limited to):
1. Personal Protective Equipment (PPE)	<p>1.1 Apron</p> <p>1.2 Mask</p> <p>1.3 Hand gloves</p> <p>1.4 Goggles</p> <p>1.5 Safety shoes</p> <p>1.6 Helmet</p>
2. Hazard	<p>2.1 Physical hazard</p> <p>2.2 Chemical hazard</p> <p>2.3 Electrical and mechanical hazard</p> <p>2.4 Biological hazard</p> <p>2.5 Ergonomic hazard</p> <p>2.6 Mental hazard</p>
3. Tools	<p>3.1 Wooden hammer</p> <p>3.2 Ball pin hammer</p> <p>3.3 Adjustable wrench</p> <p>3.4 Chuck Key</p> <p>3.5 Box wrench</p> <p>3.6 Drill chuck key</p> <p>3.7 Marking Gauge /Block</p> <p>3.8 Dial Indicator</p>
4. Routine maintenance	<p>4.1 Checking and adjust machine guards</p> <p>4.2 Checking and use coolant and lubricant</p> <p>4.3 Checking and adjust chips extraction devices</p> <p>4.4 Checking machine performance</p>

5. Drawings	<ul style="list-style-type: none"> 5.1 Views and projections 5.2 Drawing symbols 5.3 Dimensions and features 5.4 Limit, Fit and Tolerance
6. Cutting tools	<ul style="list-style-type: none"> 6.1 Tool bits (high speed steel/ carbide tips/ high carbon speed) 6.2 Side cutting tool, Grooving tool, Parting tool, Forming tool, V-thread tool, boring tools, inside thread cutting tool, knurling tool 6.3 Centre drill 6.4 Drill bits 6.5 Taps 6.6 Reamers
7. Attachment	<ul style="list-style-type: none"> 7.1 Grinding attachment 7.2 Lathe dog 7.3 Pipe center
8. Workpiece	<ul style="list-style-type: none"> 8.1 Mild steel 8.2 Carbon steel 8.3 Stainless steel 8.4 Gun metal 8.5 Bright steel 8.6 Aluminum 8.7 Brass 8.8 Copper 8.9 Nylon 8.10 Acrylic 8.11 Ebonite 8.12 Teflon
9. Instruments / equipment	<ul style="list-style-type: none"> 9.1 Outside caliper 9.2 Inside caliper 9.3 Self-centering chuck 9.4 4-jaw chuck 9.5 Drill chuck
10. Lathe accessories	<ul style="list-style-type: none"> 10.1 Face plate 10.2 Steady rest 10.3 Follower rest 10.4 Lathe dog 10.5 Dead center 10.6 Live center 10.7 Self-centering tool post
11. Lathe operations	<ul style="list-style-type: none"> 11.1 Facing and turning external shapes 11.2 Drilling 11.3 Boring

	<ul style="list-style-type: none"> 11.4 Inside tapering 11.5 Threading 11.6 Knurling 11.7 Grooving 11.8 Taper turning
12. Measuring tools	<ul style="list-style-type: none"> 12.1 measuring tape 12.2 Telescopic gauge 12.3 Vernier calipers / Digital Vernier calipers 12.4 Micrometer (inside, outside, depth) / Digital micrometer 12.5 Gauge (center, radius, screw pitch)
Evidence Guide	
The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	<p>Assessment required evidences that the candidate:</p> <ul style="list-style-type: none"> 1.1 followed Occupational Safety and Health (OSH) in the workplace 1.2 performed routine maintenance to prepare the machine for required operation 1.3 determined job requirements 1.4 setup and clamped the workpiece 1.5 interpreted drawing 1.6 performed lathe operation 1.7 checked / measured workpiece.
2. Underpinning knowledge	<ul style="list-style-type: none"> 2.1 Limit. 2.2 Fit. 2.3 Tolerance. 2.4 Allowance. 2.5 Clearance. 2.6 Fundamentals of work holding and tool holding devices. 2.7 Fundamentals of turning tools and tool geometry. 2.8 Lathe accessories, fixtures and attachments. 2.9 Cutting speed. 2.10 RPM (revolution per minute). 2.11 Feed. 2.12 Depth of cut. 2.13 Types of lathe machine 2.14 Parts of lathe machine 2.15 Operation of lathe machine
3. Underpinning skills	<ul style="list-style-type: none"> 3.1 Selecting and grinding cutting tools.

	<p>3.2 Calculating feed, cutting speed and machine rpm as per job requirement.</p> <p>3.3 Setting cutting Speed, RPM, Feed rate.</p> <p>3.4 Selecting and setting proper cutting tools.</p> <p>3.5 Holding workpieces.</p> <p>3.6 Sharpening cutting tools.</p> <p>3.7 Holding cutting tools.</p> <p>3.8 Performing required operation.</p> <p>3.9 Using measuring instruments to check dimension and tolerance.</p>
4. Underpinning attitudes	<p>4.1 Commitment to occupational health and safety</p> <p>4.2 Environmental concerns</p> <p>4.3 Eagerness to learn</p> <p>4.4 Tidiness and timeliness</p> <p>4.5 Respect for rights of peers and seniors in workplace</p>
5. Resource implications	<p>5.1 Adequate workplaces</p> <p>5.2 materials relevant to the proposed activity / task</p> <p>5.3 tools and equipment appropriate to activities or process</p> <p>5.4 Information and documentation</p> <p>5.5 relevant drawings, manuals, codes, standards and reference material.</p>
6. Methods of assessment	<p>6.1 Workplace observation</p> <p>6.2 Demonstration</p> <p>6.3 Oral questioning</p> <p>6.4 Written test</p> <p>6.5 Portfolio</p>
7. Context of assessment	<p>7.1 Competency assessment must be done in NSDA accredited assessment centre</p> <p>7.2 Assessment should be done by a NSDA certified/nominated assessor</p>

Accreditation Requirements

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Unit Code and Title	OU-CER-MM-04-L1-V1: Perform Gas and Plasma Cutting
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform gas and plasma cutting. It includes the tasks of preparing for work with (OSH) practices, setting up equipment for cutting, preparing materials for gas / plasma cutting, performing gas cutting, plasma cutting, cleaning and storing tools & equipment.
Nominal Hours	30 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Prepare for work	<p>1.1 Safe work practices are observed and <u>Personal Protective Equipment (PPE)</u> worn as required for the work performed.</p> <p>1.2 Necessary <u>tools and equipment</u> are identified and collected in accordance with work requirement.</p> <p>1.3 Materials are gathered for cutting.</p> <p>1.4 Materials are cleaned and marked for cutting as per noted dimension.</p> <p>1.5 Cutting process is selected as per standard procedure.</p>
2. Set up equipment for cutting	<p>2.1 Manual cutting requirements are identified and noted from drawings and specifications.</p> <p>2.2 Equipment is selected and set up as per job requirements.</p>
3. Perform gas cutting	<p>3.1 Heat the base metal properly to avoid distortion as per prevention measures.</p> <p>3.2 Materials are cut using proper oxy-acetylene flame and safe cutting practices.</p> <p>3.3 Cut is checked for quality.</p> <p>3.4 Defects are identified and rectified if any as per standard operating procedures.</p>
4. Perform plasma cutting	<p>1.1 Materials are cut using proper plasma flame and safe cutting practices.</p> <p>1.2 Cut is checked for quality.</p> <p>1.3 Defects are identified and rectified if any as per standard operating procedures.</p>

5. Clean and store tools & equipment	5.1 Tools and equipment are cleaned according to workplace requirement. 5.2 Tools & equipment are stored according to workplace requirement. 5.3 Fuel gas cylinders are preserved according to specification.
Range of Variables	
Variables	Range (may include but not limited to):
1. Personal Protective Equipment (PPE)	1.1 Skull helmet 1.2 Leather gloves 1.3 Boiler suit (cotton) 1.4 Leather apron 1.5 Arm guards 1.6 Safety goggles 1.7 Safety shoes
2. Tools	2.1 Chipping hammer 2.2 Ball peen hammer 2.3 Tongs 2.4 Wire brush 2.5 Grinder 2.6 Spark lighter 2.7 Nozzle cleaner 2.8 Utility wrench 2.9 Flashback Arrestor
3. Equipment	3.1 Manual gas cutting equipment 3.2 Semi-auto gas cutting machine 3.3 Plasma Cutter 3.4 Oxy acetylene Regulator
4. Materials	4.1 Mild steel 4.2 Medium carbon steel 4.3 Stainless steel
5. Cutting process	5.1 Manual 5.2 Semi-automatic 5.3 Straight line cutting as per job specification 5.4 Circle cutting 5.5 Square cutting 5.6 Angle cutting
6. Distortion prevention measures	6.1 Setting up of jigs 6.2 Fixtures 6.3 C-clamps 6.4 Pre heating

7. Oxy-acetylene flame	7.1 Pure acetylene flame 7.2 Neutral flame 7.3 Oxidizing flame 7.4 Carburizing flame
8. Defects	8.1 Distortion 8.2 Wrapping 8.3 Dirty nozzle 8.4 Excess pre heat flame 8.5 Excess cutting oxygen 8.6 Kerf defect
9. Fuel gas	9.1 Oxygen 9.2 Acetylene 9.3 Liquid petroleum gas (LPG)
Evidence Guide	
The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidences that the candidate: 1.1 identified manual cutting requirements from drawing and specifications 1.2 Cleaned and marked materials for cutting as per dimension 1.3 selected cutting process as per standard procedure 1.4 cut the materials using proper oxy-acetylene flame and safe cutting practices. 1.5 identified and rectified defects if any
2. Underpinning knowledge	2.1 OSH practices. 2.2 Gas cutting setup procedure. 2.3 Gas cutting parameter. 2.4 Procedure of gas cutting. 2.5 Application of gas cutting. 2.6 Application of plasma cutting 2.7 Principles of gas and plasma cutting 2.8 Safety precaution of handling gas cylinders 2.9 Controlling flashback 2.10 Identification of cylinder and hoses 2.11 Function of torch 2.12 List of equipment 2.13 Preheating 2.14 Adjustment of cylinder gas regulators 2.15 Types of oxy acetylene flames and their uses 2.16 Safety precaution of gas cutting 2.17 Necessity of fire back arrestor

	2.18 Procedure for work inspection. 2.19 Sequence of work.
3. Underpinning skills	3.1 Complying OSH requirements. 3.2 Selecting and setting up cutting equipment 3.3 Preparing materials for gas and plasma cutting 3.4 Applying techniques to perform gas cutting 3.5 Preparing materials for Plasma cutting 3.6 Applying techniques to perform Plasma cutting 3.7 Maintaining workplace cleanliness
4. Underpinning attitudes	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
5. Resource implications	5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Hand tools and power tools appropriate to propose activities 5.4 Information and documentation 5.5 Manual, Codes, Standards and reference materials
6. Methods of assessment	6.1 Workplace observation 6.2 Demonstration 6.3 Oral questioning 6.4 Written test 6.5 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor
<p>Accreditation Requirements</p> <p>Training Providers must be accredited by NSDA, the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of national skills qualification. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Unit Code and Title	OU-CER-MM-05-L1-V1: Perform Shielded Metal Arc Welding
Unit Descriptor	<p>This unit covers the knowledge, skills and attitudes required to perform Shielded Metal Arc Welding under supervision</p> <p>It includes Preparing for work with OSH practices, setting up equipment and job for welding, performing under supervision, maintaining cleanliness and storing tools and equipment.</p>
Nominal Hours	70 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Prepare for welding work	<p>1.1 Safe work practices are observed and <u>Personal Protective Equipment (PPE)</u> worn as required for the work performed.</p> <p>1.2 Hazards are identified and risks are minimized and controlled.</p> <p>1.3 <u>Base materials, tools, equipment</u> and <u>electrodes</u> are selected and collected as per job requirements.</p> <p>1.4 Plates are marked and cut as per job specification.</p> <p>1.5 Edges of plate are prepared as per job specification</p>
2. Setup equipment and job for welding	<p>2.1 Welding equipment is set and adjusted in accordance with job specification.</p> <p>2.2 Job is set avoiding distortions using appropriate root gap,</p> <p>2.3 Job is clamped and tacked weld at required position</p>
3. Perform welding	<p>3.1 Tack the base metal properly avoiding <u>distortion preventive measures.</u></p> <p>3.2 Welding is performed as per <u>Welding Procedure Specification (WPS).</u></p> <p>3.3 Welds are cleaned, checked for quality and <u>defects</u> are identified.</p> <p>3.4 Corrective action is taken to meet the standards.</p>

4. Maintain cleanliness and store tools and equipment	4.1 Welding machine is shutdown as per procedures. 4.2 Equipment and tools are cleaned and stored as per workplace requirements. 4.3 Wastes are disposed of following environmental compliance. 4.4 Workplace is cleaned as per workplace requirements.
Range of Variables	
Variable	Range (may include but not limited to):
1. Personal Protective Equipment (PPE)	1.1 Safety helmet 1.2 Eye shield (head screen) 1.3 Leather hand gloves 1.4 Leather apron 1.5 Boiler suit (cotton) 1.6 Leather arms guard 1.7 Safety goggles 1.8 Safety shoes 1.9 Safety belt
2. Hazards	2.1 Electrical and mechanical 2.2 Physical 2.3 Biological 2.4 Mental 2.5 Chemical 2.6 Ergonomic
3. Base materials	3.1 MS Plates 3.2 Stainless Steel 3.3 Cast iron
4. Tools	4.1 C-Clamps 4.2 Ball peen hammer 4.3 Chipping hammer 4.4 Tongs 4.5 Wire brush 4.6 Cup brush 4.7 Weld gauge 4.8 Grinder 4.9 Wrench 4.10 Try square 4.11 Level gauge
5. Equipment	5.1 SMAW - AC welding machine 5.2 DC welding machine

	5.3 Diesel generator 5.4 Electrode dryer/oven
6. Electrodes	6.1 Ø 2.5, 3.2 & 4.0 mm 6.2 E-6013, E-302, E-304, E308 6.3 CI-55
7. Distortion prevention measures	7.1 Preheating 7.2 Tack welding 7.3 Setting up of jigs 7.4 Using Fixtures 7.5 Clamping etc.
8. Weld Procedure Specification (WPS)	8.1 WPS to be prepared complying AWS (American Welding Society) standard or equivalent. 8.2 Bangladesh Standards and Testing Institute http://www.bsti.gov.bd/list.html and other related international standards
9. Defects	9.1 Lack of penetration 9.2 Excess penetration 9.3 Porosity 9.4 Crack 9.5 Slag inclusions 9.6 Spatter 9.7 Undercut 9.8 Lack of fusion 9.9 Notches 9.10 Irregular shape and dimension 9.11 Lack of side wall fusion 9.12 Under fill 9.13 Burn throw 9.14 Pin/Blow hole 9.15 Arc crater 9.16 Overlap
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	

<p>1. Critical aspect of competency</p>	<p>Assessment required evidences that the candidate:</p> <ul style="list-style-type: none"> 1.1 Controlled hazards and minimized risks 1.2 Selected and collected base metal, tools, equipment and electrodes as per job requirements 1.3 Marked and cut the plate 1.4 Setup equipment and job 1.5 Performed welding as per WPS 1.6 Maintained workplace cleanliness
<p>2. Underpinning knowledge</p>	<ul style="list-style-type: none"> 2.1 Hazards and OSH procedures 2.2 Personal safety requirement 2.3 Equipment safety requirements 2.4 Selection and preparation of base metal 2.5 Types of electrodes 2.6 Setting procedure of SMAW equipment 2.7 Welding procedures and techniques 2.8 Types of welding joints and welding positions 2.9 Types of welding defects 2.10 Position of welding 2.11 Types of welds 2.12 Prevention and rectification of welding defects 2.13 Machine shut down and housekeeping procedures
<p>3. Underpinning skills</p>	<ul style="list-style-type: none"> 3.1 Following OSH procedures in a welding workplace. 3.2 Selecting materials and prepare for welding. 3.3 Using materials, tools and equipment appropriately. 3.4 Performing welding job to meet the standards. 3.5 Preventing and rectifying welding defects. 3.6 Completing machine shut down 3.7 Maintaining 5S of housekeeping 3.8 Communication skills
<p>4. Underpinning attitudes</p>	<ul style="list-style-type: none"> 4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect for rights of peers and seniors in workplace
<p>5. Resource implications</p>	<ul style="list-style-type: none"> 5.1 Adequate workplaces 5.2 Materials for proposed activities 5.3 Hand tools and power tools appropriate to propose activities 5.4 Information and documentation 5.5 Manual, Codes, Standards and reference materials

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Development of Competency Standard

The Competency Standards for National Skills Certificate Level-01 in **Mechanical Maintenance** is Developed by NSDA on 13 – 18 December, 2022.

List of the members:

Sl. No.	Name and Address	Position in the committee
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Validation of Competency Standard

The Competency Standards for National Skills Certificate in **Mechanical Maintenance** Level-1 is validated by NSDA on 21 December, 2022.

List of the members:

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