



COMPETENCY STANDARD

Plumbing

Level: 02

(Construction Sector)

Competency Standard Code: CS-CON-PLMB-EN-L2-V2



National Skills Development Authority
Chief Advisor's Office
Government of the People's Republic of Bangladesh

Copyright

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This Competency Standard for **Plumbing** 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 reviewed by NSDA in association with Construction Sector ISC, 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 National Skills Development Authority (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 skills 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. **Plumbing** is selected as one of the priority occupations of **Construction Sector**. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of students enrolled in skills training. Trainees who successfully pass the assessment will receive a qualification under Bangladesh National Qualification Framework (BNQF) 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 **Construction sector**.

Competency standards describe the skills, knowledge 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 guide

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 and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Content Guide and Assessment Evidence Guide.

Competency Standards for National Skill Certificate – 2 in Plumbing in Construction Sector

Level Descriptors of Skills Sector, BNQF Level 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 analyze, 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

CON - Construction Sector

NSDA- National Skills Development Authority

MKS – Meter, Kilogram, Second

BNQF- Bangladesh National Qualifications Framework

OSH – Occupational Safety and Health

PPE – Personal Protective Equipment

PLMB - Plumbing

SCVC- Standards and Curriculum Validation Committee

STP – Skills Training Provider

SOP – Standard Operating Procedure

UoC - Unit of Competency

Approved by
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National Competency Standards for National Skill Certificate in Plumbing, Level 2 in Construction Sector

Course Structure

SL	Unit Code and Title	UoC Level	Nominal Hours
Generic Units of Competencies			40
1.	GU-04-L1-V1	Work in the Team Environment	1
2.	GU-03-L2-V1	Communicate in the Workplace	2
Sector Specific Units of Competencies			20
3.	SU-CON-01-L2-V1	Interpret Fundamental Elements to Work in the Construction Sector	2
Occupation Specific Units of Competencies			280
4.	OU-CON-PLMB-01-L2-V2	Perform Plumbing Layout	2
5.	OU-CON-PLMB-02-L2-V2	Perform Installation of Semi Advanced Plumbing Fittings	2
6.	OU-CON-PLMB-03-L2-V2	Install Plumbing Fixtures	2
7.	OU-CON-PLMB-04-L2-V2	Install Waste Water Pipe with fittings	2
Nominal Hours			340
Workplace Visit			20
Total Nominal Hours			360

**Units & Elements at a Glance:
Generic Competencies (40 Hours)**

Code	Unit of Competency	Elements of Competency	Duration (Hours)
GU-04-L1-V1	Work in the Team Environment	<ol style="list-style-type: none"> 1. Define team role and scope 2. Identify individual role and responsibility 3. Participate in team discussions 4. Work as a team member 	20
GU-03-L2-V1	Communicate in the Workplace	<ol style="list-style-type: none"> 1. Receive verbal instructions. 2. Interpret verbal and written information/ instruction 3. Convey instructions using verbal and written forms of communication 4. Complete written documentation 5. Participate in work place meetings and discussions. 	20
Total Hours			40

Sector Specific Competencies (20 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SU-CON-01-L2-V1	Interpret Fundamentals to Work in Construction Sector	<ol style="list-style-type: none"> 1. Describe the organizational structure within the sector 2. Identify processes and procedures 3. Identify workplace requirements 4. Organize own workload 	20
Total Hours			20

Occupation Specific Competencies (280 Hours)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
CS-OU-PLMB-01-L2-V2	Perform Plumbing Layout	<ol style="list-style-type: none"> 1. Prepare for works 2. Prepare layout 3. Setout plumbing layout 4. Maintain workplace, tools, equipment and material 	30
CS-OU-PLMB-02-L2-V2	Perform Installation of Semi Advanced Plumbing Fittings	<ol style="list-style-type: none"> 1. Prepare for works 2. Install float valve 3. Install get and ball valve 4. Maintain workplace, tools and materials 	40
CS-OU-PLMB-03-L2-V2	Install Plumbing Fixtures	<ol style="list-style-type: none"> 1. Prepare for work 2. Install fixtures 3. Maintain workplace cleanliness and store tools 	150
CS-OU-PLMB-04-L2-V2	Install Waste Water Pipe with Fittings	<ol style="list-style-type: none"> 1. Prepare for work 2. Cut pipes 3. Install pipe and fittings 4. Maintain workplace cleanliness and store tools 	60
Total Hours			280

Generic Units of Competencies

Unit Code and Title	GU-04-L1-V1: Work in the Team Environment
Unit Descriptor	This unit covers the knowledge, skills and attitudes (KSA) required to work in the team environment. It includes the task of defining team role and scope, identifying individual role and responsibility, participating in team discussions and working as a team member.
Nominal Hours	20 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Define team role and scope	1.1. Role and objectives of the team are defined. 1.2. Team structure, responsibilities and reporting relations are identified from team discussions and other external sources.
2. Identify individual role and responsibility	2.1 Individual roles and responsibilities of <u>team members</u> are identified. 2.2 Reporting relationships among team members are defined and clarified. 2.3 Reporting relationships external to the team are defined and clarified.
3. Participate in team discussions	3.1 Ideas related to team plans are contributed. 3.2 Recommendations for improving team work are put forward.
4. Work as a team member	4.1. Effective forms of communication are used to interact with team members. 4.2. Communication channels are followed. 4.3. OHS practices are followed.
Range of Variables	
Variables	Range (may include but not limited to):
1. Team Members	1.1 Coach/mentor 1.2 Supervisor/Manager 1.3 Peers/Colleagues 1.4 Employee representative
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 demonstrated knowledge in working in a team environment. 1.2 satisfied the requirements mentioned in the Performance Criteria and Range of Variables
2. Underpinning knowledge	2.1 Team Structure, Role and Responsibility 2.2 Individual Members' Roles and Responsibilities 2.3 Communication Flow and Reporting Structures 2.4 Team Planning 2.5 Interpersonal Communication Skills 2.6 Team Meeting Procedures 2.7 OHS Practices

3. Underpinning skills	3.1 Identifying the role and responsibility of the team 3.2 Identifying roles and responsibilities of individual members 3.3 Participating in team discussions 3.4 Working as a team member
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 4.6 Communication with peers and seniors in Workplace
5. Resource implications	5.1 Pens 5.2 Telephone 5.3 Computer 5.4 Writing materials 5.5 Online communication
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1. Written test 6.2. Demonstration 6.3. Oral questioning 6.4. Portfolio
7. Context of Assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module. 7.2 Assessment should be done by NSDA certified/nominated assessor.
<p>Accreditation Requirements</p> <p>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 qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Unit code and Title	GU-03-L2-V1: Communicate in the Workplace
Unit Descriptor	<p>This unit covers the knowledge, skills and attitudes (KSAs) required to communicate in the workplace.</p> <p>It includes receiving verbal instructions, interpreting verbal and written information/ instruction, conveying instructions using verbal and written forms of communication, completing written documentation and participating in work place meetings and discussions</p>
Nominal Hours	20 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables Training Components
1. Receive verbal instructions.	<p>1.1 Instructions are accessed and interpreted</p> <p>1.2 Questions are asked to clarify understanding or gain more information.</p> <p>1.3 Information/instruction is recorded.</p>
2. Interpret verbal and written information/ instruction	<p>2.1 <u>Written instructions</u> are interpreted.</p> <p>2.2 Work <u>signage's</u> are properly responded.</p> <p>2.3 Routine written instructions are followed in sequence.</p> <p>2.4 Feedback is given to workplace supervisor.</p>
3. Convey instructions using verbal and written forms of communication	<p>3.1 Relevant <u>communication</u> methods are used to transmit instructions.</p> <p>3.2 Appropriate non-verbal communication is used.</p> <p>3.3 Channels of communication are identified and followed</p> <p>3.4 Communication <u>tools and equipment</u> are operated and faults are identified and reported.</p> <p>3.5 Information is conveyed using appropriate forms.</p>
4. Complete written documentation	<p>4.1 All required <u>documentation</u> is completed</p> <p>4.2 Workplace data are recorded</p> <p>4.3 Written information/instruction is passed to personnel.</p>
5. Participate in work place meetings and discussions	<p>5.1 Meetings are attended regularly and on time.</p> <p>5.2 Meeting inputs are consistent with the meeting purpose and established protocols.</p> <p>5.3 Opinions are expressed without interruption.</p> <p>5.4 Meeting outputs are processed and implemented.</p>
Range of Variables	
Variable	Range (may include but not limited to):

1. Written instructions	<ul style="list-style-type: none"> 1.1 Supervisor's/Manager's Instructions 1.2 Memoranda 1.3 Rules and Regulations 1.4 Signage 1.5 Approved Work Plan 1.6 External communications
2. Signage	<ul style="list-style-type: none"> 2.1 On-site direction signs 2.2 Common site warnings 2.3 Location signs 2.4 Traffic signs
3. Communication	<ul style="list-style-type: none"> 3.1 Verbal instructions 3.2 Written instructions 3.3 Online communication
4. Tools and equipment	<ul style="list-style-type: none"> 4.1 Telephone 4.2 Mobile Phone 4.3 Fax machines 4.4 Two-way radio 4.5 Computers 4.6 Forms 4.7 Memo 4.8 Two-way radio
5. Forms	<ul style="list-style-type: none"> 5.1 Memorandum 5.2 Requisitioning Form 5.3 Personnel Form 5.4 Safety Report Form
6. Documentation	<ul style="list-style-type: none"> 6.1 Reports (Monthly, Quarterly, Half-Yearly, Annual) 6.2 Plans (Strategic Plan, Operational Plan, Monthly Schedule) 6.3 Monitoring and Evaluation Report 6.4 Minutes of Meetings
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	<p>Assessment required evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 demonstrated knowledge of workplace procedures in receiving, interpreting and conveying verbal & written communication. 1.2 satisfied the requirements mentioned in the Performance Criteria and Range of Variables.
2. Underpinning Knowledge	<ul style="list-style-type: none"> 2.1 Workplace Communication Policies, Standards and Procedures 2.2 Verbal and Non-verbal communication 2.3 Modes of Communication

	<p>2.4 Communication Equipment: Types, Uses and Faults</p> <p>2.5 Channels of Communication</p>
3. Underpinning Skills	<p>3.1 Receiving verbal instructions.</p> <p>3.2 Interpreting verbal and written information/ instruction</p> <p>3.3 Conveying instructions using verbal and written forms of communication</p> <p>3.4 Completing written documentation</p> <p>3.5 Participating in workplace meetings and discussions</p>
4. Underpinning Attitude	<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> <p>4.6 Communication with peers and seniors in workplace</p>
5. Resource Implications	<p>The following resources must be provided:</p> <p>5.1 Pens</p> <p>5.2 Telephone</p> <p>5.3 Computer</p> <p>5.4 Writing materials</p> <p>5.5 Online communication</p>
6. Methods of Assessment	<p>Methods of assessment may include but not limited to:</p> <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 a training center or in an actual or simulated workplace after completion of the training module.</p> <p>7.2 Assessment should be done by NSDA certified/ nominated assessor.</p>

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 qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Sector Specific Unit of Competency

Unit Code and Title	SU-CON-01-L2-V1: Interpret Fundamental Elements to Work in the Construction Sector
Unit Descriptor	This unit covers the skills, knowledge and attitude required in working in the construction sector. It includes describe the organizational structure within the construction sector, identify processes and procedures, identify tools, equipment and materials, identify workplace practices, and organize own workload, and practice OHS.
Nominal Hours	20 Hours
Elements of Competency	Performance Criteria <u>Bold and Underlined</u> terms are elaborated in the Range of Variables.
1. Describe the organizational structure within the sector	1.1 Scope, nature and <u>major fields</u> of the construction sector are determined 1.2 The profile of the construction sector in relation to Bangladesh <u>employment conditions</u> is determined 1.3 Trends and technologies relevant to the sector are explained. 1.4 Relevant policies and guidelines are identified and interpreted. 1.5 <u>Instructions</u> as to procedures in achieving quality are obtained, understood and clarified.
2. Identify processes and procedures	2.1 Construction processes are identified, described and explained. 2.2 Work activities are correctly identified. 2.3 Adjustments are interpreted.
3. Identify workplace requirements	4.1 <u>Workplace requirements</u> are identified and clarified. 4.2 Roles and responsibilities of all personnel are described. 4.3 Workplace's practices are identified. 4.4 <u>Problem-solving strategies</u> are used to address bottlenecks, inconsistencies and other concerns.
4. Organize own workload	5.1 Own work activities are planned and progress of work is communicated to relevant staff. 5.2 Work activities are completed. 5.3 Difficulties and bottlenecks are identified, and solutions are put forwarded. 5.4 Own work is monitored against workplace standards and areas for improvement identified and acted upon.
Range of Variables	
Variables	Range (may include but not limited to):

1. Major Fields	<ul style="list-style-type: none"> 1.1 Construction Site Support (Dogging, Rigging, etc.) 1.2 Carpentry and Form Works 1.3 Masonry, Brick/Block Laying and Concreting 1.4 Surface Finishing, Tiling and Painting 1.5 Roofing 1.6 Plumbing 1.7 Residential Electrical Wiring and Cabling
2. Employment conditions	<ul style="list-style-type: none"> 2.1 Code of Practice 2.2 Salary/Wage System 2.3 Labor Practices 2.4 Anti-Discrimination Policy 2.5 Gender Issues 2.6 Collective Bargaining and Other Practices 2.7 Awards 2.8 Procedures for Handling Disputes 2.9 Innovations in the Sector
3. Instructions	<ul style="list-style-type: none"> 3.1 Specifications and requirements 3.2 Standard operating procedures 3.3 Manuals of Instruction 3.4 Operations Manual 3.5 Environmental Guidelines 3.6 Gender and Develop Guidelines
4. Workplace requirements	<ul style="list-style-type: none"> 4.1 Goals and objectives 4.2 Strategic and Operational Plans 4.3 Systems and Processes 4.4 Monitoring and Evaluation 4.5 Reports and Documentation
5. Problem-solving strategies	<ul style="list-style-type: none"> 5.1 Asking questions 5.2 Feedback and Feed forward system 5.3 Reference to Standard Operating Procedures 5.4 Accessing Information 5.5 Reviews 5.6 Brainstorming
<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 demonstrated knowledge in working in the Construction sector 1.2 satisfying all the requirements mentioned in the Performance Criteria and Range of Variables

2. Underpinning knowledge	2.1 Scope and Major Divisions of the Construction Sector 2.2 Relevant Policies and Guidelines in the Construction Sector 2.3 Manuals used in the Construction Sector 2.4 Relevant Terminologies and Acronyms 2.5 Workplace Practices 2.6 Recording and Reporting practices
3. Underpinning skills	3.1 Describing the organization structure 3.2 Identifying construction processes and procedures 3.3 Identifying tools, equipment and materials 3.4 Identifying workplace practices 3.5 Organizing own workload 3.6 Practicing OHS
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 Pens 5.2 Telephone 5.3 Computer 5.4 Writing materials 5.5 Online communication
6. Methods of assessment	Competency should be assessed by 6.1 Workplace observation 6.2 Demonstration 6.3 Oral questioning 6.4 Written test 6.5 Portfolio
Context of Assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module. 7.2 Assessment should be done by NSDA certified/ nominated assessor.
<p>Accreditation Requirements</p> <p>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 qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Occupation Specific Units of Competencies

Unit Title and Code	CS-OU-PLMB-01-L2-V2: Perform Plumbing Layout
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform plumbing layout. It includes preparing for works, preparing layout, setting out plumbing layout and maintaining workplace, tools, equipment and materials.
Nominal Hours	30 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Prepare for works	1.1 OSH is observed throughout the work process 1.2 <u>Personal Protective Equipment (PPE)</u> is collected and worn as per work requirement. 1.3 Workplace is prepared as per job requirement. 1.4 <u>Tools</u> and <u>materials</u> are selected and collected as per job requirement.
2. Prepare layout	2.1 Prepared <u>Drawing</u> paper is collected to observe measurement and layout. 2.2 Layout area and location are identified as per drawing plan. 2.3 Layout for specific plumbing work is marked as per specification and measurement.
3. Setout plumbing layout	3.1 <u>Spike</u> is placed as per specification and layout. 3.2 Line <u>thread</u> is linked to the spikes as required. 3.3 Layout is checked as per specification and measurement.
4. Maintain workplace, tools, equipment and materials	41 Work area is cleaned in accordance with workplace procedures. 42 Unused materials are stored for re-use or disposed following workplace procedures. 43 Waste and scrap materials are disposed with following workplace procedures. 44 Inventory of tools equipment are conducted and recorded as per checklist. 45 Tools and equipment are cleaned and stored as per manufacturer's recommendation in appropriate location.
Range of Variables	
Variable	Range (may include but not limited to):

1. Personal Protective Equipment (PPE)	<ul style="list-style-type: none"> 1.1 Dust mask 1.2 Goggles 1.3 Safety shoes 1.4 Apron 1.5 Gloves 1.6 Ear muff 1.7 Safety belt
2. Tools	<ul style="list-style-type: none"> 2.1 Ball- pin hammer 2.2 Claw hammer 2.3 Tri-Square 2.4 Measuring tape 2.5 Sprit level / Water level pipe / Plumb bob 2.6 Steel rule
3. Materials	<ul style="list-style-type: none"> 3.1 Paper 3.2 Pen and pencil 3.3 Eraser 3.4 Spike 3.5 Thread 3.6 Marking pen / Chalk
4. Drawing	<ul style="list-style-type: none"> 4.1 Building layout plan 4.2 Plumbing drawing
5. Spike	<ul style="list-style-type: none"> 5.1 Steel nail 2 inch 5.2 Steel nail 2.5 inch
6. Thread	<ul style="list-style-type: none"> 6.1 Line thread 6.2 Nylon thread
<p>Evidence Guide</p> <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 aspect of competency	<p>Assessment required evidences that the candidate:</p> <ul style="list-style-type: none"> 1.1 selected and collected tools and material as per work requirement 1.2 identified and located layout area as per working drawing 1.3 marked at specific and approximately following drawing 1.4 laid-out plumbing plan following the specifications and consideration with the plumbing elements 1.5 placed spike following plumbing plan to working place 1.6 linked line thread to the spikes 1.7 marked by light pressure on the thread 1.8 communicated interactively with others for safe and effective work operations.

2. Underpinning knowledge	<ul style="list-style-type: none"> 2.1 Safe handling of tools 2.2 Function of tools and material for layout 2.3 Function of layout, drawing and specification. 2.4 Plumbing layout procedure 2.5 Set-out plumbing layout.
3. Underpinning skills	<ul style="list-style-type: none"> 3.1 Interpreting drawing. 3.2 Threading pipe as standard. 3.3 Marking area as into the working place. 3.4 Laying out plumbing works.
4. Required attitudes	<ul style="list-style-type: none"> 4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for rights of peers and seniors at workplace. 4.8 Communicate with peers and seniors at workplace.
5. Resource implication	<p>The following resources must be available:</p> <ul style="list-style-type: none"> 5.1 Workplace (actual or simulated) 5.2 Tools and materials relevant to the proposed activity 5.3 Drawings and specifications relevant to the task.
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 a training center or in an actual or simulated workplace after completion of the training module. 7.2 Assessment should be done by NSDA certified/ nominated assessor.
<p>Accreditation Requirements</p> <p>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 qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Unit Code and Title	CS-OU-PLMB-02-L2-V2: Perform Installation of Semi Advanced Plumbing Fittings
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform installation of advanced plumbing fittings. It includes preparing for works, installing float valve, installing get and ball valve and maintaining workplace, tools, equipment and materials.
Nominal Hours	40 Hours
Elements of Competency	Performance Criteria <u>Bold & Underlined</u> terms are elaborated in the Range of Variables
1. Prepare for works	1.1 OSH is observed throughout the work process 1.2 <u>Personal Protective Equipment (PPE)</u> is used. 1.3 Workplace is prepared as per job requirement. 1.4 <u>Tools and materials</u> are selected and collected as per job requirement.
2. Install float valve	2.1 Area is selected for installing float valve. 2.2 Teflon tape is spired clockwise 2.3 Socket is joined with water supply line firmly. 2.4 Float valve is fitted with socket and tighten as per water supply position. 2.5 Float valve is checked using water.
3. Install get and ball valve	3.1 Area is selected for installing get and ball valve. 3.2 Pipe is cut as per specification. 3.3 External thread is cut as per specification. 3.4 Threading area is cleaned and checked. 3.5 Teflon tape is spired clockwise (opposite to threading direction) on the external threaded of pipe. 3.6 Get and ball valve is connected with pipe following water direction. 3.7 Fittings are tighten firmly as per standard procedure 3.8 Leakage is checked using water supply.
4. Maintain workplace, tools and materials	4.1 Work area is cleaned in accordance with workplace procedures. 4.2 Unused materials are stored for re-use or disposed following workplace procedures. 4.3 Waste and scrap materials are disposed with following workplace procedures. 4.4 Tools are cleaned and stored as per manufacturer's recommendation in appropriate location.
Range of Variables	

Variable	Range (may include but not limited to):
1. Personal Protective Equipment (PPE)	1.1 Helmet 1.2 Goggles 1.3 Mask 1.4 Apron 1.5 Hand gloves 1.6 Safety belt 1.7 Safety shoes
2. Tools and equipment	2.1 Measurement tape 2.2 Spirit level 2.3 Hack saw frame with blade 2.4 Ball pin hammer 2.5 Screw driver 2.6 Central punch 2.7 Pipe reamer 2.8 Pencil 2.9 Pipe wrench 2.10 Adjustable spanner 2.11 Combination pliers 2.12 Plumb bob 2.13 Try square 2.14 Pipe cutter 2.15 Diestock 2.16 Steel ware brush 2.17 Pain brush 2.18 Oil cane 2.19 Pipe vice 2.20 Flat file 2.21 Mallet hammer 2.22 Long nose pliers 2.23 Sprit level 2.24 Screwdriver

3. Materials	3.1 GI pipe 3.2 PVC pipe 3.3 UPVC / CPVC pipe 3.4 Teflon tap 3.5 Solvent cement 3.6 Enamel paint 3.7 Oil 3.8 Thread
4. Fittings	4.1 Socket 4.2 Elbow 4.3 Bend 4.4 Gate valve 4.5 Ball valve 4.6 Float valve 4.7 Reducer 4.8 Nipple 4.9 Bush 4.10 Union 4.11 Socket 4.12 Nipple 4.13 Plug 4.14 End cap 4.15 Reducer socket
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 aspect of competency	Assessment required evidences that the candidate: 1.1 read and interpreted work instructions 1.2 selected materials, tool with job requirement 1.3 installed pipes and fittings with a standard slope/ gradient 1.4 prepared pipes and joints in accordance with the job requirements / speciation's 1.5 communicated interactively with others for safe and 1.6 effective work operations 1.7 determined location and piping lay-out of the working plan 1.8 consulted with plumbing designer about piping.

2. Underpinning knowledge	2.1 Materials use and specification. 2.2 plumbing processes. 2.3 Proper use of drawing tools and equipment. 2.4 plumbing layout. 2.5 Parts of plumbing system. 2.6 Plumbing pipes and fittings. 2.7 Positioning of valve. 2.8 Installation of pipes and fittings in accordance
3. Underpinning skills	3.1 Identify technical drawing. 3.2 Pipe cutting. 3.3 Fixing joints. 3.4 Fixture installing. 3.5 Making Alignment. 3.6 Site cleaning. 3.7 Valve fitting.
4. Required attitudes	4.1 Commitment to occupational safety and health. 4.2 Promptness in carrying out activities. 4.3 Sincere and honest to duties. 4.4 Eagerness to learn. 4.5 Tidiness and timeliness. 4.6 Environmental concerns. 4.7 Respect for rights of peers and seniors at workplace. 4.8 Communicate with peers and seniors at workplace.
5. Resource implication	The following resources must be available: 5.1 Workplace (actual or simulated) 5.2 Appropriate drafting instrument 5.3 Materials relevant to the proposed activity 5.4 Drawings and specifications relevant to the task.
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio.
7. Context of Assessment	7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module. 7.2 Assessment should be done by NSDA certified/ nominated assessor.

Accreditation Requirements

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requirements set by NSDA.

Unit Code and Title	CS-OU-PLMB-03-L2-V2: Install Plumbing Fixtures
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to install plumbing fixtures. It includes Practicing OSH, collecting tools, equipment and materials, installing fixtures and maintaining workplace cleanliness and store tools.
Nominal Hours	150 Hours
Elements of Competency	Performance Criteria <u>Bold and Underlined</u> terms are elaborated in the Range of Variables.
1. Prepare for work	<p>1.1 Observed OSH throughout the work Process</p> <p>1.2 <u>Personal protective equipment (PPE)</u> is collected and worn as per requirement.</p> <p>1.3 Workplace safety and health procedure is maintained as per workplace standard.</p> <p>1.4 <u>Tools and equipment</u> are selected and collected as per requirements.</p> <p>1.5 <u>Size of pipes</u> is selected as required.</p> <p>1.6 <u>Pipes</u> are selected and collected as required.</p> <p>1.7 <u>Materials</u> and <u>accessories</u> are collected as per specification.</p>
2. Install fixtures	<p>2.1 <u>Fixtures</u> are collected as per requirements.</p> <p>2.2 Fixtures are checked as per specification.</p> <p>2.3 Location of fixtures are identified.</p> <p>2.4 Accessories are connected with fixtures as per standard procedure.</p> <p>2.5 Fixtures are installed as per workplace standard.</p> <p>2.6 Fixtures are checked for functionality and faults are corrected as required.</p>
3. Maintain workplace cleanliness and store tools	<p>3.1 Workplace is cleaned as per standard procedure.</p> <p>3.2 Hazardous materials are identified, separated and disposed as per workplace procedure.</p> <p>3.3 Waste materials are disposed as per workplace procedure.</p> <p>3.4 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. Gloves</p> <p>1.2. Helmet</p> <p>1.3. Safety shoes</p> <p>1.4. Goggles</p> <p>1.5. Ear plug</p> <p>1.6. Apron</p> <p>1.7. Safety belt</p>

2. Tools and equipment	<ul style="list-style-type: none"> 2.1 Ball pein hammer 2.2 Cold chisel 2.3 Hand drill machine 2.4 Grinding machine 2.5 Pipe cutter 2.6 Pipe vice 2.7 Hacksaw 2.8 Trolley 2.9 Spirit level 2.10 Shovel 2.11 Trowel 2.12 Steel tape 2.13 Try square 2.14 Plumb bob 2.15 Pipe wrenches 2.16 Monkey wrench 2.17 Adjustable wrench 2.18 Screwdriver 2.19 Die stock 2.20 Wire brush 2.21 File
3. Sizes of pipe	<ul style="list-style-type: none"> 3.1. 12 mm dia. 3.2. 16 mm dia. 3.3. 25 mm dia. 3.4. 32 mm dia. 3.5. 40 mm dia. 3.6. 50 mm dia.
4. Pipes	<ul style="list-style-type: none"> 4.1. GI pipe 4.2. UPVC thread pipe 4.3. CPVC pipe 4.4. PVC Pipe
5. Materials	<ul style="list-style-type: none"> 5.1 Marker 5.2 Cement 5.3 Sand 5.4 Bricks 5.5 Brick/stone chips 5.6 Thread tape 5.7 Solvent cement 5.8 Waste cotton 5.9 Cutting oil 5.10 Putty 5.11 White cement 5.12 Royal plug

	5.13 Screws
6. Accessories	6.1 Faucets (kitchen and bathroom) 6.2 Soap case/ Liquid soap case 6.3 Mirror 6.4 Towel rail 6.5 Glass self 6.6 Tissue holder 6.7 Magic pipe 6.8 Connection pipe 6.9 Gratings cover
7. Fixtures	7.1 Wash basin 7.2 Sink 7.3 Commode 7.4 Toilet pan 7.5 Flashing system 7.6 urinals
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	Assessment required evidence that the candidate: 1.1. selected materials in accordance with specifications and requirements. 1.2. installed fixtures. 1.3. connected accessories with fixtures. 1.4. checked fixtures for functionality and faults.
2. Underpinning Knowledge	2.1. List and functions of tools and equipment 2.2. Fixtures and their uses. 2.3. Faucets 2.4. Fixture accessories 2.5. Waste materials disposal 2.6. Sizes of pipe 2.7. Types of Pipes used in plumbing 2.8. Advantage and disadvantages of using different types of pipes 2.9. Procedure to install different fixtures
3. Underpinning Skills	3.1. Preparing materials. 3.2. Handling tools and equipment 3.3. Performing basic masonry and cement concrete works. 3.4. Planning own work activities. 3.5. Installing fixtures and accessories 3.6. Checking leakage.
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	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 5.1. Adequate Workplace 5.2. Tools and equipment required for work activities 5.3. Materials relevant to work activity 5.4. Drawing and specifications relevant to the task.
6. Methods of assessment	<p>Assessment methods may include but not limited to:</p> <ul style="list-style-type: none"> 6.1. Demonstration 6.2. Oral questioning 6.3. Written test 6.4. Portfolio
7. 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 workplace after completion of the training module. 7.2 Assessment should be done by NSDA certified/nominated assessor.
<p>Accreditation Requirements</p> <p>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 qualification under BNQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.</p>	

Unit Code and Title	CS-OU-PLMB-04-L2-V2: Install Waste Water Pipe with Fittings
Unit Descriptor	This unit covers the knowledge, skills and attitude required to Install waste water pipe with fittings. It includes preparing for work, cutting pipes, installing pipe and fittings and maintaining workplace cleanliness and store tools
Nominal Hours	60 hours
Elements Of Competency	Performance Criteria <u>Bold & Underlined</u> words are detailed in the Range of Variables
1. Prepare for work	1.1 OSH is observed throughout the work process 1.2 <u>PPE</u> are selected and used. 1.3 <u>Tools and equipment</u> are selected and collected as per job requirement. 1.4 <u>Materials</u> are identified and collected as per work requirement 1.5 <u>Size of pipes</u> is chosen as per job requirement. 1.6 <u>Pipes</u> are selected and collected as per job requirement.
2. Cut pipes	2.1 Pipes are fixed with vice with safety precaution. 2.2 Pipes are marked as per measurement. 2.3 Pipes are cut with tolerance as per drawing and specification.
3. Install pipe and fittings	3.1 <u>Fittings</u> are selected as per requirement. 3.2 Fittings are fixed as per need. 3.3 Pipes are installed with a standard slope. 3.4 Pipes are joined. 3.5 Pipes are joined with fittings & fixtures.
4. Maintain workplace cleanliness and store tools	4.1 Workplace is cleaned as per standard procedure. 4.2 Hazardous materials are identified, separated and disposed as per workplace procedure. 4.3 Waste materials are disposed as per workplace procedure. 4.4 Tools are cleaned and stored safely in appropriate location.
Range of Variables	
Variable	Range (Include but not limited to):
1. PPE	1.1 Dust mask. 1.2 Goggles. 1.3 Safety shoes. 1.4 Apron. 1.5 Gloves. 1.6 Helmet 1.7 Safety belt

2. Tools and equipment	<ul style="list-style-type: none"> 2.1 Measuring tape 2.2 Pipe cutter/hack saw with blade. 2.3 Flat file 2.4 Chain Pulley 2.5 Hammer 2.6 Chisel 2.7 Blower 2.8 Pipe wrench. 2.9 Pipe vice. 2.10 PVC Pipe bending heater 2.11 Hand drill machine 2.12 Hand Grinding machine 2.13 Screw driver 2.14 Sprit level 2.15 Plumb bob 2.16 Steel rule 2.17 Try square 2.18 Pan 2.19 Towel 2.20 spade
3. Materials	<ul style="list-style-type: none"> 3.1 Marking chalk 3.2 Rope 3.3 Solvant cement 3.4 Hacksaw blade 3.5 Royal plug 3.6 Screw 3.7 Clamp 3.8 Cement 3.9 Sand 3.10 Brick chips 3.11 Cutting disc 3.12 Drill bits
4. Size of pipe	<ul style="list-style-type: none"> 4.1 32mm 4.2 37 mm 4.3 50mm dia. 4.4 62mm dia. 4.5 75mm dia. 4.6 100mm dia.
5. Pipes	<ul style="list-style-type: none"> 5.1 GI pipe 5.2 UPVC thread pipe 5.3 CPVC pipe 5.4 PVC Pipe
6. Vice	<ul style="list-style-type: none"> 6.1 Table vice. 6.2 Pipe vice.
7. Fittings	<ul style="list-style-type: none"> 7.1 Socket. 7.2 Elbow. 7.3 Bend. 7.4 Tee. 7.5 Reducing Tee. 7.6 Cross Tee. 7.7 Y – Tee.

	7.8 Door Tee. 7.9 Trap.
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	Competency assessment requires evidence that the candidate : 1.1 Selected and collected tools and equipment according to requirement. 1.2 Chose Size of pipes on the basis of requirement. 1.3 Selected and collected pipes. 1.4 Cut the pipes according to marking following safety rules and regulations. 1.5 Performed Thread of pipes according to requirement. 1.6 Fitted-up joint and fittings according to requirements
2. Underpinning knowledge	2.1 Types and uses of tools, equipment and materials. 2.2 Measurements. 2.3 Materials specification. 2.4 Types of pipes 2.5 Types and uses of pipe fittings 2.6 Work place cleaning 2.7 Pipe slope 2.8 Size of pipe
3. Underpinning skills	3.1 Pipe cutting 3.2 Fixing joints 3.3 Slope testing 3.4 Testing leaks 3.5 Pipes installing 3.6 Site cleaning
4. Underpinning Attitude	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 implication	The following resources should be provided: 5.1 Work place location 5.2 Tools and equipment are available 5.3 Materials relevant to proposed activity 5.4 Drawing and specifications relevant to the task
6. Methods of assessment	Assessment methods may include but not limited to: 6.1 Demonstration 6.2 Oral Interview 6.3 Written examinations 6.4 Portfolio

1. Context of Assessment	<p>7.1 Competency assessment must be done in a training center or in an actual or simulated workplace after completion of the training module.</p> <p>7.2 Assessment should be done by NSDA certified/ nominated assessor.</p>
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Accreditation Requirements

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References:

- a. Competency Standard on plumbing of BTEB
- b. Competency Standard on plumbing of NSDA

Review and Validate of Competency Standard

The Competency Standard for National Skills Certificate, Level- 2 in **Plumbing** is Reviewed and Validated by NSDA on 26 November 2024.

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