

TRAINING REGULATIONS



PLUMBING NC I

CIVIL WORKS
(CONSTRUCTION SECTOR)

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
East Service Road, South Luzon Expressway, Taguig City, Metro Manila

TABLE OF CONTENTS

CONSTRUCTION SECTOR – CIVIL WORKS SUB-SECTOR PLUMBING NC I

	Page No.
SECTION 1 PLUMBING NC I QUALIFICATION	1
SECTION 2 COMPETENCY STANDARDS	2 - 45
2.1 Basic Competencies	2 - 16
2.2 Common Competencies	17- 28
2.3 Core Competencies	29 - 45
SECTION 3 TRAINING ARRANGEMENTS	46 - 62
3.1 Curriculum Design	46
- Basic Competencies	47 - 52
- Common Competencies	53 - 56
- Core Competencies	57 - 62
3.2 Training Delivery	63 - 64
3.3 Trainee Entry Requirements	71
3.4 List of Tools, Equipment and Materials	66 - 67
3.5 Training Facilities	68
3.6 Trainers' Qualifications	68
3.7 Institutional Assessment	68
SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENTS	69 - 70
COMPETENCY MAP	71
DEFINITION OF TERMS	72 - 73
ACKNOWLEDGEMENTS	74 - 75

TRAINING REGULATIONS FOR PLUMBING NC I

SECTION 1 PLUMBING NC I QUALIFICATION

The **PLUMBING NC I** Qualification consists of competencies that a person must achieve in installing a single plumbing unit which includes one unit each of water meter, water closet, lavatory, shower with single point water heater and kitchen sink. It also includes installing floor drains and faucets.

This Qualification is packaged from the competency map of Construction – Civil Works sub-sector as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

CODE NO. BASIC COMPETENCIES

Units of Competency

500311101	Receive and respond to workplace communication
500311102	Work with others
500311103	Demonstrate work values
500311104	Practice housekeeping procedures

CODE NO. COMMON COMPETENCIES

Units of Competency

CON931201	Prepare construction materials and tools
CON311201	Observe procedures, specifications and manuals of instruction
CON311203	Perform mensuration and calculations
CON311204	Maintain tools and equipment

CODE NO. CORE COMPETENCIES

Units of Competency

CON712344	Prepare Plumbing Layout
CON712345	Make Piping Joints and Connections
CON712346	Perform Minor Construction Work
CON712347	Install and Assemble Single Plumbing Unit

A person who has achieved this Qualification is competent to be a:

- **Plumber I**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the core units of competency required in **PLUMBING NC I**. These units of competency are categorized into basic, common and core competencies.

BASIC COMPETENCIES

UNIT OF COMPETENCY : RECEIVE AND RESPOND TO WORKPLACE COMMUNICATION (*Communicate clearly*)

UNIT CODE : 500311101

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to receive, respond and act on verbal and written communication.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Follow routine spoken messages	1.1 Required information is gathered by listening attentively and correctly interpreting or understanding information/instructions 1.2 Instructions/information are properly recorded 1.3 Instructions are acted upon immediately in accordance with information received 1.4 Clarification is sought from workplace supervisor on all occasions when any instruction/information is not clear	1.1 Knowledge of organizational policies/guidelines in regard to processing internal/external information 1.2 Ethical work practices in handling communications 1.3 Communication process	1.1 Conciseness in receiving and clarifying messages/information/communication 1.2 Accuracy in recording messages/information 1.3 Communication skills
2. Perform workplace duties following written notices	2.1 Written notices and instructions are read and interpreted correctly in accordance with organizational guidelines 2.2 Routine written instruction are followed in sequence 2.3 Feedback is given to workplace supervisor based on the instructions/information received	2.1 Knowledge of organizational policies/guidelines in regard to processing internal/external information 2.2 Ethical work practices in handling communications 2.3 Communication process	2.1 Conciseness in receiving and clarifying messages/information/communication 2.2 Accuracy in recording messages/information

RANGE OF VARIABLES

VARIABLE	RANGE
1. Written notices and instructions	May include : <ol style="list-style-type: none"> 1.1. Handwritten and printed material 1.2. Internal memos 1.3. External communications 1.4. Electronic mail 1.5. Briefing notes 1.6. General correspondence 1.7. Marketing materials 1.8. Journal articles
2. Organizational Guidelines	May include: <ol style="list-style-type: none"> 2.1. Information documentation procedures 2.2. Company policies and procedures 2.3. Organization manuals 2.4. Service manual

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <p>1.1 Demonstrated knowledge of organizational procedures for handling verbal and written communications</p> <p>1.2 Received and acted on verbal messages and instructions</p> <p>1.3 Demonstrated competency in recording instructions/information</p>
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Pens</p> <p>2.2 Note pads</p>
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <p>3.1 Direct Observation</p> <p>3.2 Oral interview</p> <p>3.3 Written Evaluation</p> <p>3.4 Third Party Report</p>
4. Context for Assessment	<p>4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions</p>

UNIT OF COMPETENCY : WORK WITH OTHERS (Collaborate with others in work group activities)

UNIT CODE : 500311102

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to develop workplace relationship and contribute in workplace activities.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Develop effective workplace relationship	1.1 <i>Duties and responsibilities</i> are done in a positive manner to promote cooperation and good relationship 1.2 Assistance is sought from <i>workgroup</i> when difficulties arise and addressed through discussions 1.3 <i>Feedback</i> provided by others in the team is encouraged, acknowledged and acted upon 1.4 Differences in personal values and beliefs are respected and acknowledged in the development	1.1 Reasons why cooperation and good relationships are important 1.2 Knowledge of the organization's policies, plans and procedures 1.3 Understanding how to elicit and interpret feedback 1.4 Knowledge of workgroup member's responsibilities and duties 1.5 Importance of demonstrating respect and empathy in dealings with colleagues 1.6 Understanding of how to identify and prioritize personal development opportunities and options	1.1 Ability to read and understand the organization's policies and work procedures 1.2 Write simple instructions for particular routine tasks 1.3 Interpret information gained from correspondence 1.4 Communication skills to request advice, receive feedback and work with a team 1.5 Planning skills to organized work priorities and arrangement 1.6 Technology skills including the ability to select and use technology appropriate to a task 1.7 Ability to relate to people from a range of social, cultural and ethnic backgrounds.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Contribute to work group activities	2.1 <i>Support is provided to team members</i> to ensure workgroup goals are met 2.2 Constructive contributions to workgroup goals and tasks are made according to <i>organizational requirements</i> 2.3 Information relevant to work is shared with team members to ensure designated goals are met	2.1 Reasons why cooperation and good relationships are important 2.2 Knowledge of the organization's policies, plans and procedures 2.3 Understanding how to elicit and interpret feedback 2.4 Knowledge of workgroup member's responsibilities and duties 2.5 Importance of demonstrating respect and empathy in dealings with colleagues 2.6 Understanding of how to identify and prioritize personal development opportunities and options	2.1 Ability to read and understand the organization's policies and work procedures 2.2 Write simple instructions for particular routine tasks 2.3 Interpret information gained from correspondence 2.4 Communication skills to request advice, receive feedback and work with a team 2.5 Planning skills to organized work priorities and arrangement 2.6 Technology skills including the ability to select and use technology appropriate to a task 2.7 Ability to relate to people from a range of social, cultural and ethnic backgrounds.

RANGE OF VARIABLES

<i>VARIABLE</i>	<i>RANGE</i>
1. Duties and responsibilities	1.1 Job description and employment arrangements 1.2 Organization's policy relevant to work role 1.3 Organizational structures 1.4 Supervision and accountability requirements including OHS 1.5 Code of conduct
2. Work group	2.1 Supervisor or manager 2.2 Peers/work colleagues 2.3 Other members of the organization
3. Feedback on performance	3.1 Formal/Informal performance appraisal 3.2 Obtaining feedback from supervisors and colleagues and clients 3.3 Personal, reflective behavior strategies 3.4 Routine organizational methods for monitoring service delivery
4. Providing support to team members	4.1 Explaining/clarifying 4.2 Helping colleagues 4.3 Providing encouragement 4.4 Providing feedback to another team member 4.5 Undertaking extra tasks if necessary
5. Organizational requirements	5.1 Goals, objectives, plans, system and processes 5.2 Legal and organization policy/guidelines 5.3 OHS policies, procedures and programs 5.4 Ethical standards 5.5 Defined resources parameters 5.6 Quality and continuous improvement processes and standards

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1. Provided support to team members to ensure goals are met 1.2. Acted on feedback from clients and colleagues 1.3. Accessed learning opportunities to extend own personal work competencies to enhance team goals and outcomes
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2. Materials relevant to the proposed activity or task
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1. Direct observations of work activities of the individual member in relation to the work activities of the group 3.2. Observation of simulation and/or role play involving the participation of individual member to the attainment of organizational goal 3.3. Case studies and scenarios as a basis for discussion of issues and strategies
4. Context for Assessment	<ul style="list-style-type: none"> 4.1. Competency assessment may occur in workplace or any appropriately simulated environment 4.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : DEMONSTRATE WORK VALUES

UNIT CODE : 500311103

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitude in demonstrating proper work values.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Define the purpose of work	1.1 One's unique sense of purpose for working and the why's of work are identified, reflected on and clearly defined for one's development as a person and as a member of society 1.2 Personal mission is in harmony with company's values	1.1 Work values and ethics 1.2 Company performance and ethical standards 1.3 Company policies and guidelines 1.4 Fundamental rights at work including gender sensitivity 1.5 Work responsibilities/job functions 1.6 Corporate social responsibilities 1.7 Company code of conduct/values 1.8 Balancing work and family responsibilities	1.1 Interpersonal skills 1.2 Communication skills 1.3 Self awareness, understanding and acceptance 1.4 Application of good manners and right conduct
2. Apply work values/ethics	2.1 <i>Work values/ethics/concepts</i> are classified and reaffirmed in accordance with the transparent company ethical standards, policies and guidelines.	2.1 Work values and ethics 2.2 Company performance and ethical standards 2.3 Company policies and guidelines	2.1 Interpersonal skills 2.2 Communication skills 2.3 Self- awareness, understanding and acceptance 2.4 Application of good manners and right conduct

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	<p>2.2 Work practices are undertaken in compliance with industry work ethical standards, organizational policy and guidelines</p> <p>2.3 Personal behavior and relationships with co-workers and/or clients are conducted in accordance with ethical standards, policy and guidelines.</p> <p>2.4 Company resources are used in accordance with transparent company ethical standard, policies and guidelines</p>	<p>2.4 Fundamental rights at work including gender sensitivity</p> <p>2.5 Work responsibilities/job functions</p> <p>2.6 Corporate social responsibilities</p> <p>2.7 Company code of conduct/values</p> <p>2.8 Balancing work and family responsibilities</p>	
3. Deal with ethical problems	<p>3.1 Company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct are accessed and applied in accordance with transparent company ethical standard, policies and guidelines.</p> <p>3.2 Work incidents/situations are reported and/or resolved in accordance with company protocol/guidelines.</p> <p>3.3 Resolution and/or referral of ethical problems identified are used as learning opportunities.</p>	<p>3.1 Work values and ethics</p> <p>3.2 Company performance and ethical standards</p> <p>3.3 Company policies and guidelines</p> <p>3.4 Fundamental rights at work including gender sensitivity</p> <p>3.5 Work responsibilities/job functions</p> <p>3.6 Corporate social responsibilities</p> <p>3.7 Company code of conduct/values</p> <p>3.8 Balancing work and family responsibilities</p>	<p>3.1 Interpersonal skills</p> <p>3.2 Communication skills</p> <p>3.3 Self- awareness, understanding and acceptance</p> <p>3.4 Application of good manners and right conduct</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Maintain integrity of conduct in the workplace	<p>4.1 Personal work practices and values are demonstrated consistently with acceptable ethical conduct and company's core values.</p> <p>4.2 Instructions to co-workers are provided based on ethical, lawful and reasonable directives.</p> <p>4.3 Company values/practices are shared with co-workers using appropriate behavior and language.</p>	<p>4.1 Work values and ethics</p> <p>4.2 Company performance and ethical standards</p> <p>4.3 Company policies and guidelines</p> <p>4.4 Fundamental rights at work including gender sensitivity</p> <p>4.5 Work responsibilities/job functions</p> <p>4.6 Corporate social responsibilities</p> <p>4.7 Company code of conduct/values</p> <p>4.8 Balancing work and family responsibilities</p>	<p>4.1 Interpersonal skills</p> <p>4.2 Communication skills</p> <p>4.3 Self-awareness, understanding and acceptance</p> <p>4.4 Application of good manners and right conduct</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work values/ethics/concepts	May include: 1.1 Commitment/ Dedication 1.2 Sense of urgency 1.3 Sense of purpose 1.4 Love for work 1.5 High motivation 1.6 Orderliness 1.7 Reliability 1.8 Competence 1.9 Dependability 1.10 Goal-oriented 1.11 Sense of responsibility 1.12 Being knowledgeable 1.13 Loyalty to work/company 1.14 Sensitivity to others 1.15 Compassion/Caring attitude 1.16 Balancing between family and work 1.17 Pakikisama 1.18 Bayanihan spirit/teamwork 1.19 Sense of nationalism
2. Work practices	2.1 Quality of work 2.2 Punctuality 2.3 Efficiency 2.4 Effectiveness 2.5 Productivity 2.6 Resourcefulness 2.7 Innovativeness/Creativity 2.8 Cost consciousness 2.9 5S 2.10 Attention to details
3. Incidents/situations	3.1 Violent/intensed dispute or argument 3.2 Gambling 3.3 Use of prohibited substances 3.4 Pilferages 3.5 Damage to person or property 3.6 Vandalism 3.7 Falsification 3.8 Bribery 3.9 Sexual Harassment 3.10 Blackmail
4. Company resources	4.1 Consumable materials 4.2 Equipment/Machineries 4.3 Human 4.4 Time 4.5 Financial resources
5. Instructions	5.1 Verbal 5.2 Written

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Defined one's unique sense of purpose for working 1.2 Clarified and affirmed work values/ethics/concepts consistently in the workplace 1.3 Demonstrated work practices satisfactorily and consistently in compliance with industry work ethical standards, organizational policy and guidelines 1.4 Demonstrated personal behavior and relationships with co-workers and/or clients consistent with ethical standards, policy and guidelines 1.5 Used company resources in accordance with company ethical standard, policies and guidelines. 1.6 Followed company ethical standards, organizational policy and guidelines on the prevention and reporting of unethical conduct/behavior
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Workplace or assessment location 2.2 Case studies/Scenarios
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Portfolio Assessment 3.2 Interview 3.3 Third Party Reports
4. Context for Assessment	<ul style="list-style-type: none"> 4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : PRACTICE HOUSEKEEPING PROCEDURES**UNIT CODE : 500311104****UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required in applying the basic housekeeping procedures.**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Sort and remove unnecessary items	1.1 Reusable, recyclable materials are sorted in accordance with company/office procedures 1.2 Unnecessary items are removed and disposed of in accordance with company or office procedures	1.1 Principles of 5S 1.2 Work process and procedures 1.3 Safety signs and symbols 1.4 General OSH principles and legislation 1.5 Environmental requirements relative to work safety	1.1 Basic communication skills 1.2 Interpersonal skills 1.3 Reading skills required to interpret instructions
2. Arrange items	1.4 Items are arranged in accordance with company/office housekeeping procedures 1.5 Work area is arranged according to job requirements 1.6 Activities are prioritized based on instructions. 1.7 Items are provided with clear and visible identification marks based on procedure 1.8 Safety equipment and evacuation passages are kept clear and accessible based on instructions	2.1 Principles of 5S 2.2 Work process and procedures 2.3 Safety signs and symbols 2.4 General OSH principles and legislation 2.5 Environmental requirements relative to work safety	2.1 Basic communication skills 2.2 Interpersonal skills 2.3 Reading skills required to interpret instructions

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 Minor repairs 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>	<p>3.1 Principles of 5S</p> <p>3.2 Work process and procedures</p> <p>3.3 Safety signs and symbols</p> <p>3.4 General OSH principles and legislation</p> <p>3.5 Environmental requirements relative to work safety</p>	<p>3.1 Basic communication skills</p> <p>3.2 Interpersonal skills</p> <p>3.3 Reading skills required to interpret instructions</p>
4. Follow standardized work process and procedures	<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</p> <p>4.3 Abnormal incidents are reported to immediate supervisor</p>	<p>4.1 Principles of 5S</p> <p>4.2 Work process and procedures</p> <p>4.3 Safety signs and symbols</p> <p>4.4 General OSH principles and legislation</p> <p>4.5 Environmental requirements relative to work safety</p> <p>4.6 Accident/Hazard reporting procedures</p>	<p>4.1 Basic communication skills</p> <p>4.2 Interpersonal skills</p> <p>4.3 Reading skills required to interpret instructions</p> <p>4.4 Reporting/recording accidents and potential hazards</p>
5. Perform work spontaneously	<p>5.1 Work is performed as per instruction</p> <p>5.2 Company and office decorum are followed and complied with</p> <p>5.3 Work is performed in accordance with Occupational Safety and Health Standards (OSHS)</p>	<p>5.1 Principles of 5S</p> <p>5.2 Work process and procedures</p> <p>5.3 Safety signs and symbols</p> <p>5.4 General OSH principles and legislation</p> <p>5.5 Environmental requirements relative to work safety</p> <p>5.6 Accident/Hazard reporting procedures</p>	<p>5.1. Basic communication skills</p> <p>5.2. Interpersonal skills</p> <p>5.3. Reading skills required to interpret instructions</p> <p>5.4. Reporting/recording accidents and potential hazards</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Unnecessary items	May include: 1.1 Non-recyclable materials 1.2 Unserviceable tools and equipment 1.3 Pictures, posters and other materials not related to work activity 1.4 Waste materials
2. Identification marks	2.1 Labels 2.2 Tags 2.3 Color coding
3. Decorum	3.1 Company/ office rules and regulations 3.2 Company/ office uniform 3.3 Behavior
4. Minor repair	May include: 4.1 Replacement of parts 4.2 Application of lubricants 4.3 Sharpening of tools 4.4 Tightening of nuts, bolts and screws

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Practiced the basic procedures of 5S
2. Resource Implications	The following resources should be provided: 2.1 Facilities, materials tools and equipment necessary for the activity
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Third party report 3.2 Interview 3.3 Demonstration with questioning
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

COMMON COMPETENCIES**UNIT OF COMPETENCY : PREPARE CONSTRUCTION MATERIALS AND TOOLS****UNIT CODE : CON931201****UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes on identifying, requesting and receiving construction (plumbing) materials and tools in various workplace settings.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify materials	1.1 Materials are identified as per job requirements 1.2 Quantity and description of materials conform with the job requirements 1.3 Tools and accessories are identified according to job requirements	1.1 Different work specifications 1.2 Types and uses of plumbing materials and accessories 1.3 Types and uses of plumbing tools	1.1 Identifying tools according to the job requirements 1.2 Identifying materials and accessories according to the job requirements
2. Prepare requisition of materials	2.1 Materials and tools needed are requested according to the identified requirements 2.2 Request is done as per company standard operating procedures (SOP) 2.3 Substitute materials and tools are provided without sacrificing cost and quality of work	2.1 Work requirements 2.2 Types and uses of plumbing materials and tools 2.3 Material take-off 2.4 Requisition procedures	2.1 Preparing material take-off 2.2 Requesting materials and tools
3. Receive and inspect materials	3.1 Materials and tools issued are inspected as per quantity and specification 3.2 Tools, accessories and materials are checked 3.3 Materials and tools are set aside to appropriate location	3.1 Policy on receiving material deliveries 3.2 Material and tools quality and defects 3.3 Material handling	3.1 Checking and inspecting materials and tools 3.2 Storing/ stacking of tool and materials

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials and Tools	May include: 1.1 Electrical supplies 1.2 Structural 1.3 Plumbing 1.4 Welding/pipefitting 1.5 Carpentry 1.6 Masonry
2. Description of Materials and Tools	May include: 2.1 Brand name 2.2 Size 2.3 Capacity 2.4 Kind of application
3. Company standard procedures	May include: 3.1 Job order 3.2 Requisition slip 3.3 Borrower slip

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Listed materials and tools according to quantity and job requirements 1.2 Requested materials and tools according to the list prepared and as per company SOP 1.3 Inspected issued materials and tools as per quantity and job specifications 1.4 Tools provided with appropriate safety devices
2. Resource implications	The following resources should be provided: 2.1 Workplace location 2.2 Materials relevant to the unit of competency 2.3 Technical plans, drawings and specifications relevant to the activities
3. Methods of assessment	Competency in this unit must be assessed through: 3.1 Direct observation and oral questioning
4. Context of assessment	4.1 Competency may be assessed in the workplace or in a simulated workplace 4.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

UNIT OF COMPETENCY : OBSERVE PROCEDURES, SPECIFICATIONS AND MANUALS OF INSTRUCTION

UNIT CODE : CON311201

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes on identifying, interpreting, applying services to specifications and manuals and storing manuals.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify and access specification/manuals	1.1 Appropriate manuals are identified and accessed as per job requirements 1.2 Version and date of manual are checked to ensure that correct specification and procedures are identified	1.1 Types of manuals used in plumbing 1.2 Identification of symbols used in the manuals	1.1 Identifying manuals and specifications 1.2 Accessing information and data
2. Interpret manuals	2.1 Relevant sections, chapters of specifications/manuals are located in relation to the work to be conducted 2.2 Information and procedure in the manual are interpreted in accordance with industry practices	2.1 Types of manuals used in plumbing 2.2 Types of symbols used in manuals 2.3 System of measurements 2.4 Unit conversion	2.1 Interpreting symbols and specifications 2.2 Accessing information and data 2.3 Applying conversion of units of measurements
3. Apply information in manual	3.1 <i>Manual</i> is interpreted according to job requirements 3.2 Work steps are correctly identified in accordance with manufacturer's specification 3.3 Manual data are applied according to the given task 3.4 All correct sequencing and adjustments are interpreted in accordance with information contained on the manual or specifications	3.1 Types of manuals used in plumbing 3.2 Types and application of symbols in manuals 3.5 Unit conversion	3.1 Applying information from manuals

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Store manuals	4.1 Manual or specification is stored appropriately to prevent damage, ready access and updating of information when required in accordance with company requirements	4.1 Types of manuals used in plumbing 4.2 Manual storing and maintaining procedures	4.1 Storing and maintaining manuals

RANGE OF VARIABLES

VARIABLE	RANGE
1. Procedures, Specifications and Manuals of Instruction	May include: 1.1 Manufacturer's Specification Manual 1.2 Repair Manual 1.3 Maintenance Procedure Manual 1.4 Periodic Maintenance Manual

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires that the candidate:</p> <p>1.1 Identified and accessed specification/manuals as per job requirements</p> <p>1.2 Interpreted manuals in accordance with industry practices</p> <p>1.3 Applied information in manuals according to the given task</p> <p>1.4 Stored manuals in accordance with company requirements</p>
2. Resource implications	<p>The following resources should be provided:</p> <p>2.1 All manuals/catalogues relative to construction sector</p>
3. Methods of assessment	<p>Competency should be assessed through:</p> <p>3.1 Direct observation</p> <p>3.2 Questions/interview</p> <p>Assessment of underpinning knowledge and practical skills may be combined</p>
4. Context of assessment	<p>4.1 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines</p> <p>4.2 Assessment may be conducted in the workplace or a simulated environment</p>

UNIT OF COMPETENCY : PERFORM MENSURATION AND CALCULATIONS

UNIT CODE : CON311203

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes on identifying and measuring objects based on the required performance standards.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select measuring instruments	1.1 Object or component to be measured is identified, classified and interpreted according to the appropriate regular <i>geometric shape</i> 1.2 Measuring tools are selected/identified as per object to be measured or job requirements 1.3 Correct specifications are obtained from relevant sources 1.4 Appropriate measuring instruments are selected according to job requirements 1.5 Alternative measuring tools are used without sacrificing cost and quality of work	1.1 Types of measuring tools and its uses	1.1 Selecting measuring instruments

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Carry out measurements and calculations	<p>2.1 Accurate measurements are obtained according to job requirements</p> <p>2.2 Alternative measuring tools are used without sacrificing cost and quality of work</p> <p>2.3 Calculation needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x) and division (/)</p> <p>2.4 Calculations involving fractions, percentages and mixed numbers are used to complete workplace tasks</p> <p>2.5 Numerical computation is self-checked and corrected for accuracy</p> <p>2.6 Instruments are read to the limit of accuracy of the tool</p> <p>2.7 Systems of measurement identified and converted according to job requirements/ ISO</p> <p>2.8 Workpieces are measured according to job requirements</p>	<p>2.1 Measurements</p> <ul style="list-style-type: none"> • Linear measurement • Geometrical measurement <p>2.2 Trade Mathematics</p> <ul style="list-style-type: none"> • Unit conversion • Ratio and proportion • Area 	<p>2.1 Interpreting formulas for volume, areas, perimeters of plane and geometric figures</p> <p>2.2 Handling of measuring instruments</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Geometric shape	May include: 1.1 Round 1.2 Square 1.3 Rectangular 1.4 Triangle 1.5 Sphere 1.6 Conical
2. Measuring instruments	May include: 2.1 Micrometer (In-out, depth) 2.2 Vernier caliper (out, inside) 2.3 Dial gauge with mag, std. 2.4 Straight edge 2.5 Thickness gauge 2.6 Torque gauge 2.7 Small hole gauge 2.8 Telescopic gauge 2.9 Try-square 2.10 Protractor 2.11 Combination gauge 2.12 Steel rule 2.13 Voltmeter 2.14 Ammeter 2.15 Mega ohmmeter 2.16 Kilowatt hour meter 2.17 Gauges 2.18 Thermometers
3. Measurements and calculations	May include: 3.1 Linear 3.2 Volume 3.3 Area 3.4 Wattage 3.5 Voltage 3.6 Resistance 3.7 Amperage 3.8 Frequency 3.9 Impedance 3.10 Conductance 3.11 Capacitance 3.12 Displacement 3.13 Inside diameter 3.14 Circumference 3.15 Length 3.16 Thickness 3.17 Outside diameter 3.18 Taper 3.19 Out of roundness 3.20 Oil clearance 3.21 End play/Thrust clearance

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires that the candidate:</p> <p>1.1 Selected and prepared appropriate measuring instruments in accordance with job requirements</p> <p>1.2 Performed measurements and calculations according to job requirements/ ISO</p>
2. Resource implications	<p>The following resources should be provided:</p> <p>2.1 Workplace location</p> <p>2.2 Problems to solve</p> <p>2.3 Measuring instrument appropriate to carry out tasks</p> <p>2.4 Instructional materials relevant to the propose activity</p> <p>Assessment of underpinning knowledge and practical skills may be combined</p>
4. Methods of assessment	<p>Competency should be assessed through:</p> <p>3.1 Actual demonstration</p> <p>3.2 Direct observation</p> <p>3.3 Written test/questioning related to underpinning knowledge</p>
5. Context of assessment	<p>4.1 Competency assessment may occur in workplace or any appropriate simulated environment</p> <p>4.2 Assessment shall be observed while task are being undertaken whether individually or in group</p> <p>4.3 Competency assessment must be undertaken in accordance with the TESDA assessment guidelines</p>

UNIT OF COMPETENCY : MAINTAIN TOOLS AND EQUIPMENT

UNIT CODE : CON311204

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes on checking condition, performing preventive maintenance and storing of plumbing tools and equipment.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Check condition of tools and equipment	1.1 Materials, tools and equipment are identified according to classification and job requirements 1.2 Non-functional tools and equipment are segregated and labeled according to classification 1.3 Safety of tools and equipment are observed in accordance with manufacturer's instructions 1.4 Condition of PPE are checked in accordance with manufacturer's instructions	1.1 SAFETY PRACTICES 1.1.1 Use of PPE 1.1.2 Handling of tools and equipment 1.1.3 Good housekeeping 1.2 MATERIALS, TOOLS AND EQUIPMENT 1.2.1 Types and uses of lubricants 1.2.2 Types and uses of cleaning materials 1.2.3 Types and uses of plumbing tools 1.2.4 Types and uses of plumbing equipment 1.2.5 Operational conditions of plumbing tools and equipment 1.2.6 Plumbing tools and equipment defects	1.1 Maintaining tools and equipment 1.2 Handling of tools and equipment 1.3 Identifying tools and equipment defects

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Perform basic preventive maintenance	<p>2.1 Appropriate lubricants are identified according to types of equipment</p> <p>2.2 Tools and equipment are lubricated according to preventive maintenance schedule or manufacturer's specifications</p> <p>2.3 Measuring instruments are checked and calibrated in accordance with manufacturer's instructions</p> <p>2.4 Tools are cleaned and lubricated according to standard procedures</p> <p>2.5 Defective instruments equipment and accessories are inspected and replaced according to manufacturer's specifications</p> <p>2.6 Tools are inspected, repaired and replaced after use</p> <p>2.7 Work place is cleaned and kept in safe state in line with Occupational Safety and Health Standards (OSHS)</p>	<p>2.1 SAFETY PRACTICES</p> <p>2.1.1 Use of PPE</p> <p>2.1.2 Handling of tools and equipment</p> <p>2.1.3 Good housekeeping</p> <p>2.2 MATERIALS, TOOLS AND EQUIPMENT</p> <p>2.2.1 Types and uses of lubricants</p> <p>2.2.2 Types and uses of cleaning materials</p> <p>2.3 PREVENTIVE MAINTENANCE</p> <p>2.3.1 Methods and techniques</p> <p>2.3.2 Procedures</p>	<p>2.1 Handling of tools and equipment</p> <p>2.2 Performing preventive maintenance</p>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Store tools and equipment	<p>3.1 Inventory of tools, instruments and equipment are conducted and recorded as per company practices</p> <p>3.2 Tools and equipment are stored safely in appropriate locations in accordance with manufacturer's specifications or company procedures</p>	<p>3.1 SAFETY PRACTICES</p> <p>3.1.1 Use of PPE</p> <p>3.1.2 Handling of tools and equipment storing procedures and techniques</p> <p>3.1.3 Storage conditions/ locations</p>	<p>3.1 Storing tools and equipment</p> <p>3.2 Handling of tools and equipment</p>

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	May include: 1.1 Lubricants 1.2 Cleaning materials 1.3 Rust remover 1.4 Rugs 1.5 Spare parts
2. Tools and equipment	May include: 2.1 Tools Cutting tools - hacksaw, crosscut saw, rip saw Boring tools - auger, brace, grinlet, hand drill Holding tools - vise grip, C-clamp, bench vise Threading tools - die and stock, taps 2.2 Measuring instruments/equipment
3. PPE	May include: 3.1 Goggles 3.2 Gloves 3.3 Safety shoes 3.4 Aprons/Coveralls
4. Forms	May include: 4.1 Maintenance schedule forms 4.2 Requisition slip 4.3 Inventory Form 4.4 Inspection Form 4.5 Procedures

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires that the candidate:</p> <ul style="list-style-type: none"> 1.1 Selected and used appropriate processes, tools and equipment to carry out task 1.2 Identified functional and non-functional tools and equipment 1.3 Checked, lubricated and calibrated tools, equipment and instruments according to manufacturer's specifications 1.4 Replaced defective tools, equipment and their accessories 1.5 Observed and applied safe handling of tools and equipment and safety work practices 1.6 Prepared and submitted inventory report, where applicable 1.7 Maintained workplace in accordance with OSHA regulations 1.8 Stored tools and equipment safely in appropriate locations and in accordance with company practices
2. Resource implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Workplace 2.2 Maintenance schedule 2.3 Maintenance materials, tools and equipment relevant to the proposed activity/task
3. Methods of assessment	<p>Competency should be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation 3.2 Written test/questioning relevant to Underpinning knowledge
4. Context of assessment	<ul style="list-style-type: none"> 4.1 Competency assessment may occur in workplace or any appropriate simulated environment 4.2 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines

CORE COMPETENCIES**UNIT OF COMPETENCY : PREPARE PLUMBING LAYOUT****UNIT CODE : CON712344****UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in preparing plumbing layout.**

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare tools and materials	1.1 Identify and select tools in accordance with the job requirements. 1.2 Identify and select materials in accordance with the job requirements. 1.3 Materials are checked free from any damage or defects. 1.4 Tools are checked free from any damage or defects.	1.1 Different work requirements 1.2 Types and uses of plumbing materials 1.3 Types and uses of plumbing tools 1.4 Material take-off 1.5 Plumbing terminologies 1.6 Plumbing legends and symbols 1.7 Basic drawings and plans	1.1 Preparing tools according to the job requirements 1.2 Preparing materials according to the job requirements 1.3 Communication (written and verbal) z
2. Perform stub-out / roughing-in	2.1 Pipe stub-out/ roughing – in marking locations are identified as per job requirements. 2.2 Pipes are cut in accordance with job requirements. 2.3 Pipes stub-out/ roughing – in marking are verified according to job requirements.	2.1 Different work requirements 2.2 Types and uses of plumbing tools 2.3 Linear measurement 2.4 Stub-out/ roughing-in procedures 2.5 Standard materials use and its application	2.1 Handling of tools 2.2 Cutting and threading pipes 2.3 Applying markings 2.4 Applying measurement and mathematical computation 2.5 Applying methods /techniques in pipe stub-out roughing-in 2.6 Communication (written and verbal) skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.4 Openings for pipe sleeve are prepared according to job requirements. 2.5 Appropriate Personal Protective Equipment (PPE) is used according to safety standards. 2.6 Pipe stub-out / roughing-in plumbness and alignment are checked prior to concrete pouring. 2.7 Housekeeping is performed according to Occupational Safety and Health Standards (OSHS)	2.6 Piping system 2.7 Plumbing terminologies 2.8 Use of tools and maintenance 2.9 Plumbing codes 2.10 Plumbing legends and symbols 2.11 Reading and identifying basic drawings and plans 2.12 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	
3 Clean up work area and maintain tools	3.1 Reusable Materials are collected and stored based on specific industry standards. 3.2 Waste and scrap materials are disposed following environmental procedure. 3.3 Tools are <i>maintained</i> in accordance with work place procedures.	3.1 5S 3.2 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 3.3 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 3.4 Maintenance of tools	3.1 Communication (written and verbal) skills 3.2 Handling and maintenance of tools 3.3 Waste disposal 3.4 Maintaining tools

RANGE OF VARIABLES

VARIABLE	RANGE
1. Tools	May include: 1.1 Hacksaw with blade 1.2 Tape 1.3 Ballpeen Hammer 1.4 Pointed Chisel 1.5 Pipe Wrench 1.6 Pipe Cutter 1.7 Shovel 1.8 Pipe vise 1.9 Crow bar 1.10 Pipe threader 1.11 Cement Trowel 1.12 Hose Level 1.13 Spirit Level 1.14 Adjustable Wrench 1.15 Nylon line 1.16 Paint Brush 1.17 Plumb bob 1.18 Side Cutting Pliers 1.19 Flat Screw Driver 1.20 Framing square
2. Materials	May include: 2.1 Rags 2.2 Sand paper 2.3 Solvent cement 2.4 Tie wire / G.I. wire 2.5 Teflon tape 2.6 Gasoline 2.7 Chalk stone 2.8 Bulb 2.9 Electrical Tape
3. Pipes	May include: 3.1 PVC (DWV) Pipes and fittings series 1000 Sizes: 2" to 4" 3.2 Blue Pipes and fittings sizes ½" to 2" 3.3 Polybutylene and Polyethylene pipes and fittings 3.4 G.I. Pipes sched 40 standard 3.5 Copper Pipes and fittings Type L 3.6 Pipe – bell and spigot 3.7 PPR Pipes and fittings (PN20) 3.8 HDPE Pipes and fittings
4. Stub-out / roughing-in for :	May include: 4.1 Water line 4.2 Sewer line 4.3 Sanitary line 4.4 Storm drainage 4.5 Downspout
5. Maintenance of tools	May include: 5.1 Cleaning 5.2 Oiling 5.3 Sharpening 5.4 Re-painting 5.5 Parts replacement 5.6 Proper storage

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared tools and materials 1.2 Performed stub-out / roughing - in 1.3 Cleaned up work area and maintained tools
2. Resource Implications	The following resources should be provided: 2.1 Tools and materials related to the job 2.2 Plans, details, specifications and manuals of instruction
3. Methods of Assessment	Competency may be assessed through 3.1 Direct observation on application of tasks 3.2 Questions related to required knowledge and attitude 3.3 Demonstration with oral questioning 3.4 Written examination
4. Context for Assessment	4.1 Competency may be assessed in the workplace or in a simulated workplace setting

UNIT OF COMPETENCY : MAKE PIPING JOINTS AND CONNECTIONS**UNIT CODE : CON712345****UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes in making pipe joints for plumbing system except copper pipes and fittings.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Fit-up joints and fittings for PVC pipe	1.1 All measurements are in accordance with the piping layout/plans and specifications 1.2 Joints are made with strict adherence to perpendicularity and levelness of alignment in accordance with latest/revised plumbing code requirements. 1.3 Appropriate pipe joint is selected in line with job requirements 1.4 Joints are properly fitted-up with the required PVC/plastic solvent/cement and according to required alignments 1.5 Pipe ends are properly cleaned prior to fit-up according to standard procedures 1.6 Trial fitting is performed prior to final fit-up / connection and before applications of solvent cement or other types and jointing materials 1.7 Materials, Tools and equipment are selected according to job requirements	1.1 Different work requirement 1.2 Types and uses of plumbing tools and equipment 1.3 Types and uses of plumbing materials 1.4 Linear measurement 1.5 Plumbing codes 1.6 Methods and techniques in various type of pipe connections 1.7 Blue print reading 1.8 Materials specification 1.9 Understand economic use of material 1.10 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 1.11 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	1.1 Interpreting plans and details 1.2 Handling of materials, tools and equipment 1.3 Communication (written and verbal) 1.4 Applying methods and techniques in various type of pipe connections 1.5 Cutting and threading pipes 1.6 Applying linear measurement

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Perform pipe joints and connections	2.1 Materials, tools and equipment are selected according to job requirements 2.2 All measurements are in accordance with the piping lay-out/plans and specifications 2.3 Joints and connections are done in accordance with piping table, specifications and approved standard procedures 2.4 Teflon tape or other related jointing materials are applied to ensure leak free joints and connections.	2.1 Linear measurement 2.2 Blue print reading 2.3 Materials specification 2.4 Methods and techniques in various type of pipe joints and connections 2.5 Plumbing codes 2.6 Types and uses of plumbing tools and equipment 2.7 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 2.8 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	2.1 Interpreting plans and details Handling of materials, tools and equipment 2.2 Communication (written and verbal) 2.3 Applying methods and techniques in various type of pipe connections 2.4 Cutting and threading pipes 2.5 Applying linear measurement
3. Caulk cast iron (CI) pipes and fittings	3.1 Joints are firmly packed and fitted to a depth of not less than 25.4 mm and are aligned with each other 3.2 Adhesives are glued thoroughly at the inside and outside edges of the joint 3.3 Caulked joint is extended to not more than 3.2 mm below the rim of the hubless 3.4 Couplers are used to connect pipes and	3.1 Linear measurement 3.2 Blue print reading 3.3 Materials specification 3.4 Types and uses of plumbing hand tools 3.5 Plumbing codes 3.6 Environmental-conservation	3.1 Interpreting plans and details 3.2 Handling of materials, tools and equipment 3.3 Communication (written and verbal) 3.4 Applying methods and techniques in various type of pipe connections 3.5 Cutting pipes 3.6 Applying linear measurement

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.5 fittings to hubless pipes Appropriate PPE is used according to job requirements	3.7 procedures, e.g. 3R (reduce, reuse, recycle) DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	

RANGE OF VARIABLES

VARIABLE	RANGE
1. PVC pipe joint	May include: 1.1 Right angle 1.2 180° 1.3 30° / 60°
2. Tools and equipment	May include: 2.1 Kettle 2.2 Blow torch 2.3 Pipe hangers and supports 2.4 Chisel 2.5 Pipe cutter 2.6 Hacksaw with blade 2.7 Hammer 2.8 Pipe threader 2.9 Pipe wrench 2.10 Pipe vise 2.11 Cutting outfit set 2.12 Welding machine 2.13 Threading machine
3. Personal Protective Equipment (PPE)	Must include: 3.1 Gloves 3.2 Hard hat 3.3 Safety shoes 3.4 Goggles 3.5 Welding mask 3.6 Face shield

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Competency assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Fitted-up joints and fittings according to job requirements/specifications 1.2 Performed threaded connections in accordance with piping table/specifications and according to standard procedures 1.3 Caulked joints in accordance with job requirements/specifications 1.4 Demonstrated compliance with safety regulations applicable to work site operations 1.5 Selected materials in accordance with specifications and job requirements 1.6 Accurately set out dimensions and alignment of work 1.7 Identified defects and problems that occur and made necessary action to rectify 1.8 Interactively communicated with others where applicable to ensure safe and effective work operations
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Tools and equipment appropriate to joint and connections process 2.2 Materials relevant to the proposed activity 2.3 Drawings and specifications relevant to the task
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation on application of tasks 3.2 Questions related to required knowledge 3.3 Demonstration with oral questioning 3.4 Written examination
4. Context for Assessment	<ul style="list-style-type: none"> 4.1 Competency may be assessed in the workplace or in a simulated workplace setting

UNIT OF COMPETENCY : PERFORM MINOR CONSTRUCTION WORK

UNIT CODE : CON712346

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in performing minor construction work prior to and after the installation of pipes and fittings.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRE SKILLS
1. Make piping Layouts	1.1 Work instructions are read and interpreted according to job requirements 1.2 Materials, tools and equipment are selected according to job requirements 1.3 Lay-outs are made according to specified roughing-in measurements 1.4 Work dimension and alignment of work are in conformity with specification/plan	1.1 Linear measurement 1.2 Blue print reading 1.3 Types and uses of plumbing tools 1.4 Types and uses of plumbing materials 1.5 Plumbing codes 1.6 Basic carpentry and masonry works processes 1.7 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 1.8 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	1.1 Interpreting plan and details 1.2 Handling materials, tools and equipment 1.3 Performing basic carpentry masonry processes 1.4 Communication (written and verbal)

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRE SKILLS
2. Cut pipes through walls and floors	2.1 Cutting thru walls is performed without causing unnecessary damage to floors/walls and adjacent systems/installations 2.2 Correct usage of tools is observed according to job requirements 2.3 Appropriate PPE is used according to job requirements 2.4 Cut walls and floor surface are restored to original condition	2.1 Linear measurement 2.2 Blue print reading 2.3 Materials specification 2.4 Types and uses of plumbing tools 2.5 Plumbing codes 2.6 Basic carpentry and masonry processes 2.7 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 2.8 DOLE Department Order No. 13 s. 1998 2.9 Guidelines Governing Occupational Safety and Health in the Construction Industry	2.1 Interpreting plans and details 2.2 Handling tools and materials 2.3 Performing basic carpentry and masonry works processes 2.4 Communication (written and verbal) 2.5 Applying linear measurement

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	May include: 1.1 Soapstone 1.2 Marking tools 1.3 Steel tape 1.4 Leveling tools
2. Tools and equipment	May include: 2.1 Hammer 2.2 Cold chisel 2.3 Saw 2.4 Drill 2.5 Hacksaw 2.6 Push cart 2.7 Spirit level 2.8 Shovel 2.9 Pointing trowel 2.10 Push pull rule 2.11 Concrete cutter 2.12 Rubber mallet
3. Personal protective equipment (PPE)	May include: 3.1 Gloves 3.2 Hard hat 3.3 Safety shoes 3.4 Goggles 3.5 Face shield 3.6 Dust mask

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Competency assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Read and interpreted work instructions according to job requirements 1.2 Selected materials in accordance with specifications and job requirements 1.3 Performed pipe layout 1.4 Cut pipes through walls and floors 1.5 Demonstrated compliance with safety regulations applicable to work site operations 1.6 Accurately set out dimensions and alignment of work 1.7 Identified faults and problems that occur and made necessary action to rectify 1.8 Communicated interactively with others where applicable to ensure safe and effective work operations
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Tools and equipment appropriate to the job 2.2 Materials relevant to the proposed activity 2.3 Drawings and specifications relevant to the task
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation on application of tasks 3.2 Questions related to required knowledge 3.3 Demonstration with oral questioning 3.4 Written examination
4. Context for Assessment	<ul style="list-style-type: none"> 4.1 Competency may be assessed in the workplace or in a simulated workplace setting

UNIT OF COMPETENCY : INSTALL AND ASSEMBLE SINGLE PLUMBING UNIT

UNIT CODE : CON712347

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in the installation/assembling of a single plumbing unit.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare for plumbing works	1.1 Work instructions/plans are read and interpreted in accordance with the job requirements 1.2 Materials, tools and equipment are selected and prepared according to job requirements 1.3 Appropriate PPE are selected according to job requirements	1.1 Blue print reading 1.2 Materials specification 1.3 Types and uses of plumbing tools and equipment 1.4 Materials take-off 1.5 DOLE Department Order No. 13 s. 1998 (Guidelines Governing Occupational Safety and Health in the Construction Industry)	1.1 Interpreting plan and details 1.2 Handling of materials, tools and equipment 1.3 Communication (written and verbal)
2. Install pipes and fittings	2.1 Pipes and fittings are installed with a standard slope in accordance with Revised National Plumbing Code of the Philippines (RNPCP) and venting requirements and procedures 2.2 Drainage/sewer/vent piping system are aligned with water supply and provided with clean-outs in the required locations prescribed in the approved work plan	2.1 Linear measurement 2.2 Blue print reading 2.3 Materials specification 2.4 Methods and techniques in various type of pipe connections 2.5 Plumbing codes 2.6 Types and uses of plumbing tools and equipment 2.7 Materials take-off 2.8 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle)	2.1 Interpreting plans and details 2.2 Handling of materials, tools and equipment 2.3 Communication (written and verbal) 2.4 Applying methods and techniques in various type of pipe connections 2.5 Cutting and threading pipes 2.6 Applying linear measurement

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Approved fittings are used in installing drainage/sewer pipes 2.4 Correct usage of tools and equipment is observed according to manufacturer's specifications 2.5 Appropriate PPE are used in accordance with the job requirements	2.9 DOLE Department Order No.13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	
3. Install hot- and cold- water supply	3.1 Correct specifications of pipes and joints are used in accordance with the job requirements/ specifications 3.2 Hot and cold water supply is installed according to the approved working plan and materials specifications 3.3 Water supply assembled is leak free/free from contamination and aligned with drainage/vent/ waste piping system 3.4 Materials, tools and equipment are selected in accordance to job requirements	3.1 Linear measurements Blue print reading 3.2 Materials specification 3.3 Types uses of plumbing materials, tools and equipment 3.4 Materials take-off 3.5 Methods and techniques in various type of pipe connections 3.6 Plumbing codes 3.7 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 3.8 DOLE Department Order No. 13 s. 1998 3.9 Guidelines Governing Occupational Safety and Health in the Construction Industry.	3.1 Interpreting plans and details 3.2 Handling of materials, tools and equipment 3.3 Communication (written and verbal) 3.4 Applying methods and techniques in various type of pipe connections 3.5 Cutting and threading pipes 3.6 Applying linear measurement

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
4. Install/ assemble plumbing fixtures	4.1 Plumbing fixtures are installed according to specified rough-in measurements and/or manufacturer's instruction manual 4.2 Plumbing fixtures are rigidly secured with strict adherence to perpendicularity and levelness 4.3 All assemblies are in conformity with the listed standard 4.4 Correct usage of tools and equipment is observed in accordance with manufacturer's specifications 4.5 Appropriate PPE are used in accordance with the job requirements 4.6 Work site is cleaned and kept in safe state and in accordance with Occupational Safety and Health Standards (OSHS)	4.1 Linear measurement 4.2 Blue print reading 4.3 Materials specification 4.4 Types and uses of plumbing tools and equipment 4.5 Methods and techniques in various type of pipe connections 4.6 Plumbing codes 4.7 Plumbing fixtures take-off 4.8 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 4.9 DOLE Department Order No. 13 s. 1998 4.10 Guidelines Governing Occupational Safety and Health in the Construction Industry	4.1 Interpreting plans and details 4.2 Handling of materials, tools and equipment 4.3 Communication (written and verbal) 4.4 Applying methods and techniques in various type of plumbing fixtures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Tools and equipment	May include: 1.1 Pipe threader 1.2 Monkey wrench 1.3 Push – pull rule/steel tape 1.4 Reamer 1.5 Blow torch 1.6 Flaring/Swaging tools 1.7 Pipe cutter/hacksaw 1.8 Hammer 1.9 Leveling tools 1.10 Rubber mallet
2. Personal Protective Equipment (PPE)	May include: 2.1 Gloves 2.2 Hard hat 2.3 Safety Shoes 2.4 Face shield 2.5 Dust mask 2.6 Goggles
3. Pipes and fittings	May include: 3.1 PVC (DWV) Pipes and fittings series 1000 Sizes: 2” to 4” 3.2 PVC Blue Pipes and fittings sizes ½” to 2” 3.3 Polybutylene and Polyethylene pipes and fittings 3.4 G.I. Pipes sched 40 standard 3.5 Copper Pipes and fittings Type L 3.6 C.I. Pipe – bell and spigot 3.7 PPR Pipes and fittings (PN20) 3.8 HDPE Pipes and fittings
4. Plumbing fixtures	May include: 4.1 Lavatory 4.2 Kitchen sink 4.3 Bathtub 4.4 Flush valve 4.5 Faucets 4.6 Shower accessories: <ul style="list-style-type: none"> • Shower valve • Shower head • Spout 4.7 Electronic flushing device (urinal, closet, faucet) 4.8 Water closet 4.9 Bidet 4.10 Floor drain

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Competency assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Read and interpreted work instructions according to job requirements 1.2 Selected materials, tools and equipment in accordance with specifications and job requirements 1.3 Installed pipes and fittings in accordance with the required standards in the RNPCP 1.4 Installed/assembled plumbing fixtures according to specified rough-in measurements and/or manufacturer's specifications and required standard in the RNPCP 1.5 Demonstrated compliance with safety regulations applicable to work site operations 1.6 Identified faults and problems that occur and made necessary action to rectify 1.7 Communicated interactively with others where applicable to ensure safe and effective work operations 1.8 Completed performing single plumbing unit installation and assembly
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Tools and equipment appropriate to the job 2.2 Materials relevant to the proposed activity 2.3 Drawings and specifications relevant to the task
3. Methods of Assessment	<p>Competency should be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct observation on application of tasks 3.2 Questions related to required knowledge 3.3 Demonstration with oral questioning 3.4 Written examination
4. Context for Assessment	4.1 Competency may be assessed in the workplace or in a simulated workplace setting

3 TRAINING ARRANGEMENTS

These standards are developed to give technical and vocational education and training (TVET) provides information and guidance on important requirements needed when designing training programs for certain qualifications.

These include information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainer's qualification.

3.1 CURRICULUM DESIGN

TESDA shall provide the training on the development of competency-based curricula to training providers. This will equip them with needed knowledge and skill in developing their own curricula based on the components mentioned below.

Delivery of knowledge requirements for the basic, common and core units of competency specifically in the areas of mathematics, science/technology, communication/language and other academic subjects shall be contextualized. To this end, TVET providers shall develop a Contextual Learning Matrix (CLM) to accompany their curricula.

Course Title: **PLUMBING** **NC Level: I**

Nominal Training Duration : **28 Hrs. (Basic)**
20 Hrs. (Common)
120 Hrs. (Core)
168 Hrs.

Course Description:

This course is designed to equip individual with operational skills in Plumbing, such as prepare plumbing layout, make piping joints and connections, perform minor construction works and install and assemble single plumbing unit.

To complete the course, all units prescribed for this qualification must be achieved.

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
1. Receive and respond to workplace communication	1.1 Follow routinary speaking & message	<ul style="list-style-type: none"> • Parts of a speech • Parts of a sentence • Kinds of sentence 	<ul style="list-style-type: none"> • Exercise Conciseness in receiving and clarifying messages/ information/ communication 	<ul style="list-style-type: none"> • Group discussion • Interaction • Reportorial • Modular 	<ul style="list-style-type: none"> • Interviews/ • Questioning • Practical/ • Performance Test • Observation 	4 Hours
	1.2 Perform work duties following written notices	<ul style="list-style-type: none"> • Knowledge of organizational policies/guidelines in regard to processing internal/external information. • Work practices in handling communications • Communication processes • Receiving and clarifying communications, messages and information. • Recording messages 	<ul style="list-style-type: none"> • Practice Accuracy in following written/ oral instruction/ information • Practice written and oral communication skills • Case Study in handling written communication • Practice relaying/ disseminating messages/ information • Analyze different messages 	<ul style="list-style-type: none"> • Lecture/ • Discussion • Demonstration • Case Study 	<ul style="list-style-type: none"> • Written • Practical • Writing • Demonstration 	4 Hours

Unit of Competency	Learning Outcomes	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
2. Work with others	2.1 Develop effective workplace relationship	<ul style="list-style-type: none"> • Job description and employment arrangement. • Organization's policy relevant to work role • Team structure • Supervision and accountability requirements including OHS • Code of conduct • Assisting a colleagues • Open communication channels • Acknowledging satisfactory/unsatisfactory performance • Formal/informal performance appraisal • Obtaining feedback from supervisor and colleagues and clients • Personal reflective behavior strategies • Routine organization methods for monitoring service delivery • Ethical sentences 	<ul style="list-style-type: none"> • Practice cooperation and good relationship • Team structuring • Practice OHS Code • Routine task analysis • Practice communication skills in requesting advice, receiving feedback • Work effectively with team • Apply personal decision and organized work priorities • Apply appropriate technology for a given task. • Practice monitoring of service delivery 	<ul style="list-style-type: none"> • Group discussion • Role play • Interaction 	<ul style="list-style-type: none"> • Interviews/ • Oral Questioning • Written Test • Demonstration • Observation 	4 Hours

Unit of Competency	Learning Outcomes	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
	2.2 Contribute to work group activities	<ul style="list-style-type: none"> • Explaining /clarifying. • Helping colleagues • Providing encouragement • Undertaking extra task if necessary • Goals, objectives, plans system and process • Legal and organizational policy/guidelines and requirements • Define resources parameters • Quality and continues improvement processes and standard • Clarifying the organization's preferred task completion methods • Open communication • Encouraging colleagues • Acknowledging satisfactory/unsatisfactory performance • Workplace hazards, risks and control 	<ul style="list-style-type: none"> • Application of personal attribute towards organization policies and work procedures • Writing of simple instruction or work plan for a particular routine or task • Application of planning skills in organizing and prioritizing work • Apply particular skills in selected technology appropriate in performing task • Practice proper personal relationship • Exercise personal relationship with others thru social, cultural and ethnic background. 	<ul style="list-style-type: none"> • Group discussion • Role play • Interaction • 	<ul style="list-style-type: none"> • Interviews/ • Oral Questioning • Written Test • Demonstration • Observation 	4 Hours

Unit of Competency	Learning Outcomes	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
3. Demonstrate work values	3.1 Define the purpose of work	<ul style="list-style-type: none"> • Purpose of Work • Benefits gained out of work 	<ul style="list-style-type: none"> • Simulate work and working condition 	<ul style="list-style-type: none"> • Group discussion • Interaction 	<ul style="list-style-type: none"> • Demonstration • Observation • Interviews / • Questioning 	2 Hours
	3.2 Apply work values / ethics	<ul style="list-style-type: none"> • Concept of work values/ethics • Company policies and guidelines 	<ul style="list-style-type: none"> • Practice work values and work ethics in a simulated environment • Perform sample inventory of company's/ industry resources 	<ul style="list-style-type: none"> • Lecture • Group Discussion • Role Play 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Self-paced 	2 Hours
	3.3 Deal with ethical problems	<ul style="list-style-type: none"> • Work ethical standard • Company/industry resources • Work practices • Company's identified ethical problems • Work incidents/ situation • Standard operating procedures • Report writing and documentation 	<ul style="list-style-type: none"> • Present situation depicting ethical problems in work • Practice Standard operating procedures • Practice reporting and documenting work process 	<ul style="list-style-type: none"> • Lecture • Group Discussion • Role Play 	<ul style="list-style-type: none"> • Written Exam • Demonstration • Observation • Self-paced 	2 Hour

Unit of Competency	Learning Outcomes	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
	3.4 Maintain integrity of conduct in the workplace	<ul style="list-style-type: none"> Fundamental rights at work including gender sensitivity Work responsibilities/ functions Corporate social responsibilities Human Relations Interpersonal Relations Value Formation Professional Code of Conduct and Ethics 	<ul style="list-style-type: none"> Simulate work responsibilities, corporate and social responsibilities Role play proper inter personal relationship Practice professional code of conduct and ethics towards work 	<ul style="list-style-type: none"> Lecture Group Discussion Role Play Self-paced 	<ul style="list-style-type: none"> Written Exam Demonstration Observation Self-paced Interviews/ Questioning 	1 Hour
4. Practice housekeeping procedures	4.1 Sort and remove unnecessary items	<ul style="list-style-type: none"> Principles of 5S Safety signs and symbols Environmental requirements relative to work safety Accident/Hazard reporting procedures 	<ul style="list-style-type: none"> Practice and demonstrate 5S Analyze and perform practice exercises involving environmental requirement relative to work 	<ul style="list-style-type: none"> Lecture Group Discussion Role Play Self-paced 	<ul style="list-style-type: none"> Demonstration Observation Interviews / questioning 	1 Hour
	4.2 Arrange items					1 Hour
	4.3 Maintain work areas, tools and equipment	<ul style="list-style-type: none"> Maintenance system Maintenance of tools and equipment Good Housekeeping procedures Proper Attitude towards work 	<ul style="list-style-type: none"> Development of maintenance procedures for equipment, tools and materials Monitor maintenance system for equipment, tools and materials 			1 Hour

Unit of Competency	Learning Outcomes	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
	4.4 Follow standardize work process and procedures					1 Hour
	4.5 Perform work spontaneously					1 Hour

COMMON COMPETENCIES

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
1. Prepare construction materials and tools	1.1 Identify materials	<ul style="list-style-type: none"> • Different work specifications • Types, uses and description of plumbing materials and accessories • Types, uses and description of plumbing tools • List of materials as per company standards 	<ul style="list-style-type: none"> • Identifying tools according to the job requirements • Identifying materials and accessories according to the job requirements 	<ul style="list-style-type: none"> • Lecture • Demonstration • Group discussion • PowerPoint presentation 	<ul style="list-style-type: none"> • Direct observation • Questions or interview • Written test • Portfolio (credentials) 	2 Hours
	1.2 Requisition materials	<ul style="list-style-type: none"> • Work requirements • Types and uses of plumbing materials and tools • Material take-off • Requisition procedures 	<ul style="list-style-type: none"> • Preparing material take-off • Requesting materials and tools • Accomplishing materials requisition form 	<ul style="list-style-type: none"> • Discussion • Simulation 	<ul style="list-style-type: none"> • Direct observation • Questions or interview 	1 Hour
	1.3 Receive and inspect materials	<ul style="list-style-type: none"> • Policy on receiving material deliveries • Material and tools quality and defects • Material handling 	<ul style="list-style-type: none"> • Checking and inspecting received/delivered materials and tools • Storing/ stacking of tool and materials 	<ul style="list-style-type: none"> • Practical Exercise • Demonstration 	<ul style="list-style-type: none"> • Written / Oral Test • Demonstration 	1 Hour

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
2. Observe procedures, Specifications and Manuals of Instruction	2.1 Identify and access specification / manuals	<ul style="list-style-type: none"> Types of manuals used in plumbing Identification of symbols used in the manuals 	<ul style="list-style-type: none"> Identifying manuals and specifications Accessing information and data 	<ul style="list-style-type: none"> Lecture Demonstration 	<ul style="list-style-type: none"> Oral questioning Written test or examination 	2 Hours
	2.2 Interpret manuals	<ul style="list-style-type: none"> Types of manuals used in plumbing Types of symbols used in manuals System of measurements Unit conversion 	<ul style="list-style-type: none"> Interpreting symbols and specifications Accessing information and data Applying conversion of units of measurements 	<ul style="list-style-type: none"> Actual demonstration Group discussion 	<ul style="list-style-type: none"> Direct observation Written test or examination 	2 Hours
	2.2 Apply information in manual	<ul style="list-style-type: none"> Types of manuals used in plumbing Types and application of symbols in manuals Unit conversion 	<ul style="list-style-type: none"> Applying information from manuals 	<ul style="list-style-type: none"> Demonstration Group discussion 	<ul style="list-style-type: none"> Demonstration (able to impart knowledge and skills) Practical and oral exam 	2 Hours
	2.3 Store Manual	<ul style="list-style-type: none"> Types of manuals used in plumbing Manual storing and maintaining procedures 	<ul style="list-style-type: none"> Storing and maintaining manuals 	<ul style="list-style-type: none"> Demonstration Group discussion 	<ul style="list-style-type: none"> Demonstration Practical and oral exam 	2 Hours
3. Perform mensurations and calculation	3.1 Select measuring instruments	<ul style="list-style-type: none"> Types of measuring tools and its uses 	<ul style="list-style-type: none"> Selecting measuring instruments 	<ul style="list-style-type: none"> Lecture-demonstration Group discussion 	<ul style="list-style-type: none"> Direct observation Oral questioning 	2 Hours
	3.2 Carry out measurements and calculations	<ul style="list-style-type: none"> Measurements <ul style="list-style-type: none"> Linear measurement Geometrical measurement Trade Mathematics <ul style="list-style-type: none"> Unit conversion Ratio and proportion Area 	<ul style="list-style-type: none"> Interpreting formulas for volume, areas, perimeters of plane and geometric figures Handling of measuring instruments 	<ul style="list-style-type: none"> Group discussion Practical Lab Demonstration 	<ul style="list-style-type: none"> Written test or examination Third party report Demonstration (able to impart knowledge and skills) 	2 Hours
4. Maintain Tools and Equipment	4.1 Check condition of tools and	<ul style="list-style-type: none"> Safety practices <ul style="list-style-type: none"> use of PPE handling of tools and 	<ul style="list-style-type: none"> Maintaining tools and equipment Handling of tools and 	<ul style="list-style-type: none"> Lecture-demonstration Group 	<ul style="list-style-type: none"> Direct observation 	2 Hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
	equipment	equipment - good housekeeping • Materials, tools and equipment - types and uses of lubricants - types and uses of cleaning materials - types and uses of plumbing tools - types and uses of plumbing equipment • Operational conditions of plumbing tools and equipment • Plumbing tools and equipment defects	equipment • Identifying tools and equipment defects	discussion	• Oral questioning	

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
	4.2 Perform basic preventive maintenance	<ul style="list-style-type: none"> • Safety practices <ul style="list-style-type: none"> - use of PPE - handling of tools and equipment - good housekeeping • Materials, tools and equipment <ul style="list-style-type: none"> - types and uses of lubricants - types and uses of cleaning materials • Preventive maintenance <ul style="list-style-type: none"> - Methods and techniques - Procedures 	<ul style="list-style-type: none"> • Handling of tools and equipment • Performing preventive maintenance 	<ul style="list-style-type: none"> • Simulation • Group discussion • Practical Lab • Demonstration 	<ul style="list-style-type: none"> • Written test or examination • Third party report • Demonstration (able to impart knowledge and skills) 	1 Hour
	4.3 Store tools and equipment	<ul style="list-style-type: none"> • Safety practices <ul style="list-style-type: none"> - use of PPE - handling of tools and equipment - good housekeeping - Storing procedures and techniques - Storage conditions/ locations 	<ul style="list-style-type: none"> • Storing tools and equipment • Handling of tools and equipment 	<ul style="list-style-type: none"> • Demonstration • Group discussion • Practical Lab 	<ul style="list-style-type: none"> • Practical exam • Direct observation • Written test 	1 hour

CORE COMPETENCIES

Unit of Competency	Learning Outcome	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
1. Prepare Plumbing Layout	1.1 Prepare Tools and Materials	<ul style="list-style-type: none"> • Classification and types of plumbing materials and pipes • Different plumbing tools ,materials and its uses • Different plumbing symbols and legend • Basic plumbing lay-out and plans 	<ul style="list-style-type: none"> • Prepare simple residential plumbing lay-out • Identify and familiarize with different plumbing tools, materials and equipment and its functions and uses 	<ul style="list-style-type: none"> • Discussion • Demonstration • Workshop 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	8 Hours
	1.2 Perform stub-out / roughing-in	<ul style="list-style-type: none"> • Different plumbing work requirement • Stub-out/roughing in procedures Plumbing codes 	<ul style="list-style-type: none"> • Perform stub-out and roughing in job Practice plumbing codes 	<ul style="list-style-type: none"> • Discussion • Demonstration • Workshop 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	12 Hours
	1.3 Clean up work area and maintain tools	<ul style="list-style-type: none"> • Maintenance of tools • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Perform 5S Clean up work area and maintenance of tools 	<ul style="list-style-type: none"> • Discussion • Demonstration • Workshop 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	10 Hours

Unit of Competency	Learning Outcome	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
2. Make Piping Joints and Connections	2.1 Fit-up joint and fittings for PVC pipe	<ul style="list-style-type: none"> • Methods and techniques in various types of plumbing connections • Linear measurement • Plumbing codes • Types of pipes and fittings • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Perform pipe joints and connections • Exercise proper handling of plumbing tools, materials and equipment 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	12 Hours
	2.2 Perform threaded pipe joints and connections	<ul style="list-style-type: none"> • Types of pipes joint • Methods and techniques in various type of pipe connections • Blue print reading • Materials specification • Understand economic use of material • Environmental-conservation procedures, • Occupational safety and health in the industry 	<ul style="list-style-type: none"> • Cutting and threading of pipes • Applying linear measurements • Read plumbing plans and drawings 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	10 Hours

Unit of Competency	Learning Outcome	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
	2.3 Caulk joints	<ul style="list-style-type: none"> • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry • Caulking joints • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Perform caulking joints 			8 Hours
3. Perform Minor Construction Works	3.1 Perform piping layouts	<ul style="list-style-type: none"> • Methods and techniques in various type of pipe connections • Blue print reading • Materials specification 	<ul style="list-style-type: none"> • Applying linear measurements • Read plumbing plans and drawings 	<ul style="list-style-type: none"> • Discussion • Demonstration • Workshop 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	16 Hour

Unit of Competency	Learning Outcome	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
	3.2 Cut pipes through walls and floors	<ul style="list-style-type: none"> Understand economic use of material Environmental-conservation procedures, Occupational safety and health in the industry DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> Perform basic masonry and carpentry works Exercise OHS procedures 			14 Hours
4 Install and Assemble Single Plumbing Unit	4.1 Prepare for plumbing works	<ul style="list-style-type: none"> Blue print reading Types and uses of plumbing materials, tools, and equipment DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> Read plumbing plans and drawings 	<ul style="list-style-type: none"> Discussion Demonstration Workshop 	<ul style="list-style-type: none"> Observation Written and Oral examination Demonstration 	4 Hours
	4.2 Install pipes and fittings	<ul style="list-style-type: none"> Various methods and techniques in installing pipes and fittings National Plumbing Code of the Philippines Drainage/sewer piping system 	<ul style="list-style-type: none"> Exercise proper use of tools and equipment Install drainage/sewer piping system Install pipes and fitting based on job requirements 	<ul style="list-style-type: none"> Discussion Demonstration Workshop 	<ul style="list-style-type: none"> Observation Written and Oral examination Demonstration 	10 Hours

Unit of Competency	Learning Outcome	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
	4.1 Install hot and cold water supply	<ul style="list-style-type: none"> • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry • Different pipes and fittings for hot and cold plumbing installations • Brazing requirement of pipes and fittings • Different tools, materials and equipment used in hot and cold plumbing installations • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 		<ul style="list-style-type: none"> • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	8 Hours
	4.2 Install/ assemble plumbing fixtures	<ul style="list-style-type: none"> • Identification of different plumbing fixture • Proper installation procedures of different plumbing fixture 	<ul style="list-style-type: none"> • Read plans and drawing • Interpret plumbing symbols 	<ul style="list-style-type: none"> • Discussion • Demonstration • Video presentation 	<ul style="list-style-type: none"> • Observation • Written and Oral examination • Demonstration 	8 Hours

Unit of Competency	Learning Outcome	Learning Content	Practical Activities	Methodology	Assessment Approach	Nominal Duration
		<ul style="list-style-type: none"> • Proper utilization of tools in installing and assembling plumbing fixture • Different Personal Protective Equipment (PPE) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Interpret plans and drawing for hot and cold plumbing installations • Perform pipe brazing • Cutting pipes • Classify tools, materials and equipment for hot and cold plumbing installation • Interpret plans and drawing used in installing and assembling plumbing fixture • Install/assemble different plumbing fixture • Practice OHSC guidelines in plumbing installations 			

3.2 TRAINING DELIVERY

1. The delivery of training shall adhere to the design of the curriculum and guided by the principles of competency-based TVET.
 - a. Course design is based on competency standards set by the industry or recognized industry sector; (Learning system is driven by competencies written to industry standards)
 - b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;
 - c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.
 - d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;
 - e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.
 - f. Training program allows for recognition of prior learning (RPL) or current competencies;
 - g. Training completion is based on satisfactory performance of all specified competencies.
2. The competency-based TVET system recognizes various types of delivery modes, both on- and off-the-job as long as learning is guided by the competency standards specified by the industry. The following training modalities and its variations/components may be adopted singly or in combination with other modalities when designing and delivering training programs:

2.1 Institution- Based:

- Dual Training System (DTS)/Dualized Training Program (DTP) which contain both in-school and in-industry training or fieldwork components. Details can be referred to the Implementing Rules and Regulations of the DTS Law and the TESDA Guidelines on the DTP;
- Distance learning is a formal education process in which majority of the instruction occurs when the students and instructor are not in the same place. Distance learning may employ correspondence study, audio, video, computer technologies or other modern technology that can be used to facilitate learning and formal and non-formal training. Specific guidelines on this mode shall be issued by the TESDA Secretariat.
- The traditional classroom-based or in-center instruction may be enhanced through use of learner-centered methods as well as laboratory or field-work components.

2.2 Enterprise-Based:

- Formal Apprenticeship – Training within employment involving a contract between an apprentice and an enterprise on an approved apprenticeable occupation.
- Informal Apprenticeship - is based on a training (and working) agreement between an apprentice and a master craftsman wherein the agreement may be written or oral and the master craftsman commits to training the apprentice in all the skills relevant to his or her trade over a significant period of time, usually between one and four years, while the apprentice commits to contributing productively to the work of the business. Training is integrated into the production process and apprentices learn by working alongside the experienced craftsman.
- Enterprise-based Training - where training is implemented within the company in accordance with the requirements of the specific company. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

- 2.3 Community-Based** – short term programs conducted by non-government organizations (NGOs), LGUs, training centers and other TVET providers which are intended to address the specific needs of a community. Such programs can be conducted in informal settings such as barangay hall, basketball courts, etc. These programs can also be mobile training program (MTP).

3.3 TRAINEE ENTRY REQUIREMENTS

This section specifies the qualifications of trainees including their education/experience

- At least Junior High School (Grades 9 & 10) level or graduate;
- Can perform basic mathematical computation; and
- Able to communicate orally and in writing.

This list does not include specific institutional requirements such as written entrance exam, appropriate work experience, and other that may be required of the trainees by the school or training center delivering TVET program.

3.4 LIST OF TOOLS, EQUIPMENT AND MATERIALS

Recommended list of tools, equipment and materials for the training of 25 trainees for Plumbing NC I.

TOOLS					
Qty	Description	Qty	Description	Qty	Description
4. units each size	Pipe wrench (sizes 10", 12", 14")	2 units	Wheelbarrow	2 pcs	Pail Plastic / G.I. (3 gals.)
2 units	Pressure gauge ¼ size –(0-300psi)	6 units	Shovel	6 sets	Plumbing Blue Print Plan
3 units	Pick Mattock	6 pcs.	Ballpeen hammer (1 1/2 dia.)	1 set	Manual Pipe Threader (1/2", ¾," 1" sizes)
6 pcs.	Steel Tape (5m)	6 pcs	Paint brush (1")	5 units	Basin wrench, size 10"
6 pcs	Hacksaw with Blade	3 pcs	Pipe Cutter (1/2" – 1")		
4 units	Spirit level bar or water hose level	2 pcs.	Adjustable Wrench (8" and 10")		
3 units	Reamer (Pipe)	2 pcs.	Mechanical Plier		
4 units	Cement trowel (pointed)	1 unit	Pipe vise(chain or Yoke)		
6 pcs	Cold Chisel (var. lengths 8"-12" dia. 5/8")	2 units	Plastic Drum (200 liters)		
EQUIPMENT/ PPE					
Qty	Description	Qty	Description	Qty	Description
1 unit	Manual Test pump	25 pcs	Hard Hat	25 pcs	Hand Gloves
1 unit	Fusion Machine (20mm – 32mm)	25 pcs	Safety Shoes	25 pcs	Dust Masks
2 units	Electric Drill (drill bit ¼" - ½")	25 pcs	Goggles	12 pcs	Face Shield
4 units	Blow torch				
2 units	Electric Grinder (4")				
MATERIALS					
Qty	Description	Qty	Description	Qty	Description
6 rolls	Pattern paper	SANITARY, WASTE AND VENT SYSTEM		COLD WATER SUPPLY AND DISTRIBUTION PIPING	
2 boxes	Pen and pencil	16 lengths	PVC Pipe 4" x 3m s-1000	PVC BLUE PIPE S AND FITTINGS	
PPR PIPES AND FITTINGS		25 lengths	PVC Pipe 2" x 3m s-1000	25 pcs	PVC Blue Pipe ½" x 10'
25 pcs	PPR Pipes 20mm x 4 mtrs.	25 pcs	PVC Wye 4" x 4"	150 pcs	PVC Tee ½" x ½"
25 pcs	PPR Gate Valve 20mm	150 pcs	PVC Wye 4" x 2"	150 pcs	PVC Tee Female ½" x ½"
150 pcs	PPR Tee Equal 20m x 20mm	225 pcs	PVC Tee 4" x 2"	150 pcs	PVC Elbow ½" x 90°
225 pcs	PPR Tee Female 20mm x ½"	200 pcs	PVC Tee 2" x 2"	75 pcs	PVC Elbow Female ½" x 90°
150 pcs	PPR Equal Elbow 20mm x 90°	50 pcs	PVC Elbow 4" x 90°	150 pcs	PVC Cap ½"

75 pcs	PPR Elbow Female 20mm x 1/2 x 90°	50 pcs	PVC Elbow 4" x 45°	100 pcs	PVC Male Adapter 1/2"
150 pcs	PPR End Cap 20mm	300 pcs	PVC Elbow 2" x 90°	100 pcs	PVC Female Adapter 1/2"
150 pcs	PPR Male Adapter 1/2"	150 pcs	PVC Elbow 2" x450°		G.I. PIPES AND FITTINGS
150 pcs	PPR Female Adapter 1/2"	50 pcs	PVC P- Trap 2"	13 pcs	G.I Pipe 1/2 " x 20 sch. 40
175 pcs	G.I. Plug 1/2"	25 pcs	PVC Cleanout 4"	25 pcs	Gate Valve 1/2" – kitz brand
150 rolls	Teflon Tape 3/4"	15 cans	PVC Solvent Cement 400cc	75 pcs	G.I. Tee 1/2" x 1/2"
Plumbing Fixtures				100 pcs	G.I. Elbow 1/2" x 90°
5 units	Water Meter			50 pcs	G.I. Cap n1/2"
5 units	Water Closet (Flush Tank)			5 pcs	Single shower valve
5 sets	Lavatory with faucet				
5 sets	Kitchen Sink with faucet				
5 units	Single Point water heater				
15 pcs	Floor drains				
10 sets	Faucets				

3.5 TRAINING FACILITIES

The Construction – Civil Works (Plumbing) NC I workshop must be of concrete structure. Based on class size of 25 students/trainees the space requirements for the teaching/learning and circulation areas are as follows:

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS
• Student/Trainee Working Space	5 x 8	40	40
• Lecture Room/Demo Room	5 x 5	25	25
• Wash Room	2 x 5	10	10
• Tool Room	5 x 5	25	25
• Laboratory Area	5 unit – 2 x 4	40	40
• Facilities/Equipment/ Circulation area	6 x 7	42	42
Workshop Area	10 x 18		180

3.6 TRAINER'S QUALIFICATIONS

- Holder of National TVET Trainers Certificate level I-Plumbing NC I or higher NC level
- Preferably Registered Master Plumber
- Preferably with a minimum of 2 years relevant industry experience (plumbing works) in all of the following:
 - Prepare Plumbing Layout
 - Make Piping Joints and Connections
 - Perform Minor Construction Works
 - Install and Assemble Single Plumbing UnitNote: Certified by the employer
- Must have completed the 40-Hour Construction Safety Training Course (COSH) as per Department Order No. 13 s. 1998, Guidelines Governing Occupational Safety and Health in the Construction Industry conducted by OSHC and DOLE accredited Safety Training Organizations
- Must be computer-literate

3.7 INSTITUTIONAL ASSESSMENT

Institutional assessment is undertaken by trainees to determine their achievement of units of competency. A certificate of achievement is issued for each unit of competency.

SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENTS

Competency Assessment is the process of collecting evidence and making judgments on whether competency has been achieved. The purpose of assessment is to confirm that an individual can perform according to the standards expected at the workplace as expressed in the relevant competency standards.

The assessment process is based on evidence or information gathered to prove achievement of competencies. The process may be applied to employable unit(s) of competency in partial fulfillment of the requirements of the national qualification.

4.1 NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1.1 A National Certificate (NC) is issued when a candidate has demonstrated competence through project-type assessment covering all the units of competency that comprise the Training Regulations for Plumbing NC I as follows:

BASIC COMPETENCIES
Receive and respond to workplace communication
Work with others
Demonstrate work values
Practice housekeeping procedures
COMMON COMPETENCIES
Prepare construction materials and tools
Observe procedures, specifications and manuals of instruction
Perform mensuration and calculations
Maintain tools and equipment
CORE COMPETENCIES
Prepare Plumbing Layout
Make Piping Joints and Connections
Perform Minor Construction Works
Install and Assemble Single Plumbing Unit

4.1.2 Candidates aiming to be certified will have to be assessed in accordance with the requirements identified in the evidence guide of the relevant unit/s of competency.

4.1.3 Candidates applying for competency assessment and certification for Plumbing NC I should be:

4.1.3.1 Graduates of formal, non-formal and informal institutions including enterprise-based training programs,

4.1.3.2 Experienced workers (wage-employed or self-employed)

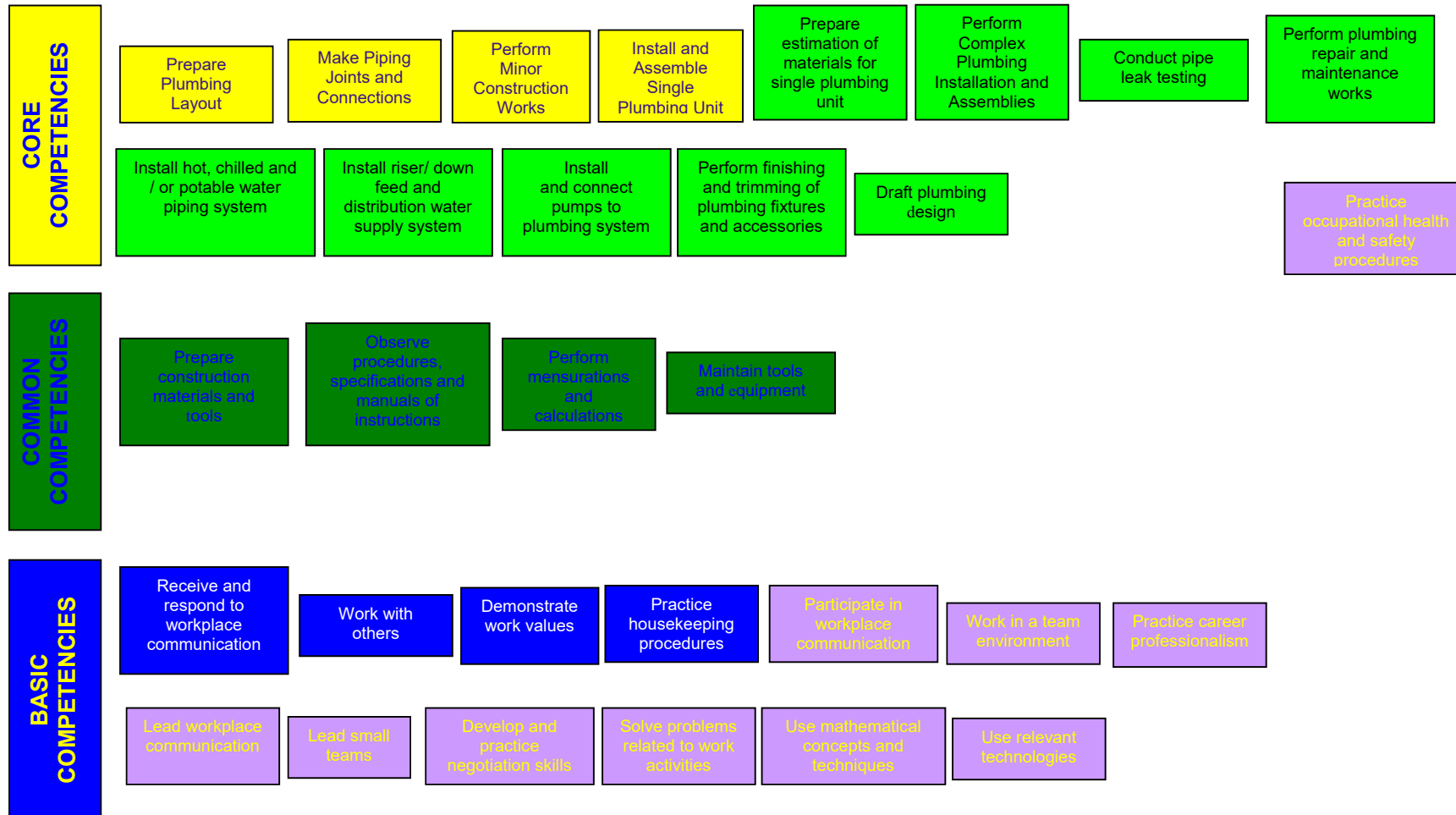
4.1.4 Conduct of assessment and issuance of certificates shall adhere to the procedures manual and implementing guidelines developed for this purpose.

4.2 COMPETENCY ASSESSMENT REQUISITES

- 4.2.1 Self-Assessment Guide. The self-assessment guide (SAG) is accomplished by the candidate prior to actual competency assessment. SAG is a pre-assessment tool to help both the candidate and the assessor determine what evidence is available, where gaps exist, including readiness for assessment. This document can:
- a. Identify the candidate's skills and knowledge
 - b. Highlight gaps in candidate's skills and knowledge
 - c. Provide critical guidance to the assessor and candidate on the evidence that need to be presented
 - d. Assist the candidate to identify key areas in which practice is needed or additional information or skills that should be gained prior
- 4.2.2 Accredited Assessment Center. Only Assessment Centers accredited by TESDA are authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.
- 4.2.3 Accredited Competency Assessor. Only accredited competency assessors are authorized to conduct assessment of competence. Competency assessors undergo a quality-assured accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

PLUMBING NC I

**COMPETENCY MAP
CONSTRUCTION
PLUMBING SUB-SECTOR**



DEFINITION OF TERMS

1. Certification Refers to the process of verifying and validating competencies of a person through assessment.
2. Competency Is the application of knowledge, skills and attitudes to perform work activities to the standard expected in the workplace.
3. Element Refers to the building blocks of a unit of competency. It describes in outcome terms the functions that a person who works in a particular area of work is able to perform.
4. Evidence Guide It is a guide for assessment that provides information on critical aspects of competency, underpinning knowledge, underpinning skills, resource implications, context of assessment and assessment method.
5. Level Refers to the category following the level of difficulty and complexity of skills and knowledge required to do the job.
6. Performance Criteria Is an evaluative statement that specifies what is to be assessed and the required level of performance.
7. Philippine Qualifications Framework A quality-assured national system for the development, recognition and award of qualifications based on standards of knowledge, skills and values acquired in different ways and methods by learners and workers in of a certain country
8. Pipe Refers to a cylindrical conduit or conductor conforming to the particular dimensions commonly known as “pipe size” and is denoted by its interior diameter or I.D.
9. Plumbing appliance Refers to any one of a special class of device or equipment intended to perform a special plumbing function. Its operation and/or control may be dependent upon one or more energized components, such as motors, controls, heating elements and pressure-temperature-sensing elements. Such device or equipment may operate automatically through one or more of the following actions; a time cycle, a temperature range, a pressure range, a measured volume or weight; or the device or equipment may be manually adjusted or controlled by the user or operator.
10. Plumbing appurtenance It is a manufactured device or a prefabricated assembly or an on-the-job assembly of component parts, and serve as adjunct to the basic piping system and plumbing fixtures. An appurtenance demands no additional water supply nor does it add any discharge load to fixture or the drainage system. It performs some useful functions in the operation, maintenance, servicing, economy or safety of the plumbing system.

11.Plumbing	It is the art and technique of installing pipes, fixtures and other apparatuses in buildings for bringing in the supply, liquids, substances and/or ingredients and removing them; and such water, liquid and other carried-wastes hazardous to health, sanitation, life, property; also the pipes and fixtures after installation i.e., the plumbing system.
12.Plumbing fixtures	Are approved-type installed receptacles, devices or appliances supplied with water or receive liquid or liquid-borne wastes and discharge such wastes into the drainage system to which they may be directly or indirectly connected. Industrial or commercial tanks, vats and similar processing equipment are not plumbing system fixtures, but may be connected to or discharged into approved traps or plumbing fixtures as provided for in this Code.
13.Plumbing system	Refers to all potable water supply and distribution pipes, all plumbing fixtures and traps, all sanitary and storm drainage systems; vent pipes, roof drains, leaders and downspouts; and all building drains and sewers, including their respective joints and connections; devices, receptacles, and appurtenances within the property; water lines in the premises; potable , tap, hot and chilled water pipings; potable water treating or using equipment; fuel gas piping; water heaters and vents for same.
14.Plumbing unit	Refers to a minimum standard quantity of plumbing fixtures that discharge wastes into a plumbing installation including; one (1) water meter, one (1) water closet, one (1) lavatory, one (1) shower head and drain for a bathtub or shower stall, one (1) kitchen sink, one (1) laundry tray and three (3) floor drains and four (4) faucets/hose bibb.
15.Potable water	Is a water satisfactory for drinking, culinary and domestic purposes and meets the requirements of the Philippine National Standards for Drinking Water.
16.Pressure	Is a normal force exerted by a homogenous liquid or gas, per unit of area on the wall of the container.
17.Qualification	Refers to the national certificate issued by the TESDA or its accredited industry organizations in recognition that a person has achieved competencies relevant to a trade or industry.
18.Range of Variables	It describes the circumstances or context in which the work is to be performed.
19.Unit of Competency	Refers to a discrete aspect of work, which would normally be performed by only one person.
20.Unplasticized Polyvinyl Chloride Conduit (UPVC)	Refers to a non-metallic conduit into which electrical wire may be drawn and with an outside diameter sufficiently different from that of metallic conduit.

ACKNOWLEDGEMENTS

The Technical Education and Skills Development Authority (TESDA) wishes to thank the following persons from ***Philippine Society of Plumbing Engineers Inc. (PSPE)***, industry, academe and government agencies for sacrificing their time and sharing expertise in the development and validation of these Training Regulations.

THE TECHNICAL EXPERTS PANEL (TEP) – REVIEW PANEL

MR. ALBERTO T. CABAEL

AAA Plumbing Services Inc.
No. 446 –A Kennedy 1 Bldg. F.
Blumentritt St., Kabayanan
San Juan City
Tel. Nos.: 655-9633; 664-5033
Fax No.: 726-9145

MR. JASON MAGOS

Green Line Construction Works, Inc.
6B Rodriguez Drive, Jordan Valley
Subd., Baesa, Quezon City
Telefax. No.: 361-5179
email add.: jasonmagos@yahoo.com

MR. IGNACIO M. AGUITO

Journeyman and Skilled Plumbers
Association(JASPA)
email Add: mkigna@yahoo.com

MR. RICARDO D. TAYTAY

Sea Wave Pools
Unit 2-E, Glorious Aqua Building
116 P. Santos St., Malibay, Pasay City
Telefax No.: 852-2271
email add.: ric_taytay@yahoo.com

MR. VIRGILIO D. SIMBULAN

Professional Regulation Commission
Tel. No.: 927-5942

MR. CRISANTO S. LIM

Homeworld Engineering
Telefax: 412-8744

ANTONIO C. PADRINAO

Philippine Society of Plumbing Engineers,
Inc. (PSPE)
Tel. No. 332-8713

The PARTICIPANTS in the Validation of these Training Regulations

MR. KIN IERREO D. VEGA

AAA PLUMBING (Plumber)
No. 446-AF Kennedy St., Barangay
Kabayanan, San Juan City

MS. CARMELYN O. DE SAGON

AAA PLUMBING (Plumber)
No. 446-AF Kennedy St., Barangay
Kabayanan, San Juan City

MR. WILFREDO C. EDLOY, JR.

PIPE SYSTEM (Plumber)
389 Old Sta Mesa, Manila

MR. JOSEPH ALISON D. DELA TORRE
Glacier North Refrigeration
Cell. No. (0915) 3720246

MR. MARCO F. BILDAN
Tarlac State University
Cell. No. (0920) 9290420

MR. EDGARDO P. PEÑA
Solid Homes Realty Engineering Services
and Construction
Tel. No.: (044) 288-2795

MP. ALVIN R. MAHAYAG
Citiare Industrial Services Corporation
Tel. No. 351-6723

MR. EDWIN B. BARAL
Physical Plant Site Development Services
Nueva Vizcaya State University
Tel. No. (078) 805-3273

MR. CARLITO K. DESPI
Instructor
Escuela Taller
Tel. No. 525-1986

Members of the TESDA Board

TESDA EXCOM

The MANAGEMENT and STAFF of the TESDA Secretariat

TESDA - Qualifications and Standards Office (QSO)