

TRAINING REGULATIONS



PLUMBING NC II

PLUMBING
(CONSTRUCTION SECTOR)

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

TABLE OF CONTENTS

CONSTRUCTION SECTOR – CIVIL WORKS SUB-SECTOR PLUMBING NC II

	Page No.
SECTION 1 PLUMBING NC II QUALIFICATION	1
SECTION 2 COMPETENCY STANDARDS	2 - 57
2.1 Basic Competencies	2- 20
2.2 Common Competencies	21- 38
2.3 Core Competencies	39- 57
SECTION 3 TRAINING ARRANGEMENTS	58 - 78
3.1 Curriculum Design	58
- Basic Competencies	59 - 62
- Common Competencies	63 - 66
- Core Competencies	66 - 72
3.2 Training Delivery	73 - 74
3.3 Trainee Entry Requirements	75
3.4 List of Tools, Equipment and Materials	76 - 78
3.5 Training Facilities	78
3.6 Trainers' Qualifications	79
3.7 Institutional Assessment	79
SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENTS	80 - 81
COMPETENCY MAP	82
DEFINITION OF TERMS	83 - 84
ACKNOWLEDGEMENTS	85 - 86

TRAINING REGULATIONS FOR PLUMBING NC II

SECTION 1 PLUMBING NC II QUALIFICATION

The **PLUMBING NC II** Qualification consists of competencies that a person must achieve in installing multiple units of plumbing system with multi-point hot- and cold-water lines for medium-rise buildings. It also includes plumbing repair and maintenance work.

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

500311105	Participate in workplace communication
500311106	Work in a team environment
500311107	Practice career professionalism
500311108	Practice occupational health and safety procedures

CODE NO. COMMON COMPETENCIES

Units of Competency

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

CODE NO. CORE COMPETENCIES

Units of Competency

CON713321	Prepare estimation of materials for multiple plumbing units
CON713322	Perform multiple units of plumbing installation and assemblies
CON713323	Conduct pipe leak testing
CON713312	Perform plumbing repair and maintenance work

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

- Plumber II

SECTION 2 COMPETENCY STANDARDS

The **PLUMBING NC II** Qualification consists of competencies that a person must achieve to enable him/her to prepare estimation of materials for single plumbing unit, perform complex plumbing installation and assemblies, conduct pipe leak testing and perform plumbing repair and maintenance works.

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE :500311105

UNIT DESCRIPTOR :This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1 Obtain and convey workplace information	1.1 Specific and relevant information is accessed from appropriate sources 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information 1.3 Appropriate medium is used to transfer information and ideas 1.4 Appropriate non- verbal communication is used 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed 1.6 Defined workplace procedures for the location and storage of information are used 1.7 Personal interaction is carried out clearly and concisely	1.1 Effective communication 1.2 Different modes of communication 1.3 Written communication 1.4 Organizational policies 1.4 Communication procedures and systems 1.5 Technology relevant to the enterprise and the individual's work responsibilities	1.1 Following simple spoken language 1.2 Performing routine workplace duties following simple written notices 1.3 Participating in workplace meetings and discussions 1.4 Completing work related documents 1.5 Estimating, calculating and recording routine workplace measures 1.6 Relating to people of social range in the workplace 1.7 Gathering and providing information in response to workplace requirements

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2 Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established protocols 2.4 Workplace interactions are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented	2.1 Effective communication 2.2 Different modes of communication 2.3 Written communication 2.4 Organizational policies 2.5 Communication procedures and systems 2.6 Technology relevant to the enterprise and the individual's work responsibilities	2.1 Following simple spoken language 2.2 Performing routine workplace duties following simple written notices 2.3 Participating in workplace meetings and discussions 2.4 Completing work related documents 2.5 Estimating, calculating and recording routine workplace measures 2.6 Relating to people of social range in the workplace 2.7 Gathering and providing information in response to workplace requirements
3 Complete relevant work related documents	3.1 Range of forms relating to conditions of employment are completed accurately and legibly 3.2 Workplace data is recorded on standard workplace forms and documents	3.1 Effective communication 3.2 Different modes of communication 3.3 Written communication	3.1 Completing work related documents 3.2 Applying basic mathematical processes of addition, subtraction, division and multiplication

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines	3.4 Organizational policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	3.3 Gathering and providing information in response to workplace requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	4.1. Personnel forms, telephone message forms, safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocols	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> 1.1. Prepared written communication following standard format of the organization 1.2. Accessed information using communication equipment 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting the formal or informal communication
2. Resource Implications	<p>The following resources should be provided:</p> <ol style="list-style-type: none"> 2.1. Fax machine 2.2. Telephone 2.3. Writing materials 2.4. Internet
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ol style="list-style-type: none"> 3.1. Direct Observation 3.2. Oral interview and written test
4. Context for Assessment	<ol style="list-style-type: none"> 4.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY : **WORK IN TEAM ENVIRONMENT**

UNIT CODE : **500311106**

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Describe team role and scope	1.1 The <i>role and objective of the team</i> is identified from available <i>sources of information</i> 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources	1.1 Communication process 1.2 Team structure 1.3 Team roles 1.4 Group planning and decision making	1.1 Communicate appropriately, consistent with the culture of the workplace
2. Identify own role and responsibility within team	2.1 Individual role and responsibilities within the team environment are identified 2.2 Roles and responsibility of other team members are identified and recognized 2.3 Reporting relationships within team and external to team are identified	2.1 Communication process 2.2 Team structure 2.3 Team roles 2.4 Group planning and decision making	2.1 Communicate appropriately, consistent with the culture of the workplace

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Work as a team member	3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and workplace context 3.3 Observed protocols in reporting using standard operating procedures 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members	3.1 Communication process 3.2 Team structure 3.3 Team roles 3.4 Group planning and decision making	3.1 Communicate appropriately, consistent with the culture of the workplace 3.2 Interacting effectively with others

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	2.1. Standard operating and/or other workplace procedures 2.2. Job procedures 2.3. Machine/equipment manufacturer's specifications and instructions 2.4. Organizational or external personnel 2.5. Client/supplier instructions 2.6. Quality standards 2.7. OSH and environmental standards
3. Workplace context	3.1. Work procedures and practices 3.2. Conditions of work environments 3.3. Legislation and industrial agreements 3.4. Standard work practice including the storage, safe handling and disposal of chemicals 3.5. Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> 1.1. Operated in a team to complete workplace activity 1.2. Worked effectively with others 1.3. Conveyed information in written or oral form 1.4. Selected and used appropriate workplace language 1.5. Followed designated work plan for the job 1.6. Reported outcomes
2. Resource Implications	<p>The following resources should be provided:</p> <ol 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 tasks
3. Methods of Assessment	<p>Competency in this unit may be assessed through:</p> <ol style="list-style-type: none"> 3.1. Observation 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 in teamwork
4. Context for Assessment	<ol style="list-style-type: none"> 4.1. Competency may be assessed in workplace or in a simulated workplace setting 4.2. Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Integrate personal objectives with organizational goals	1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships are maintained in the course of managing oneself based on performance evaluation 1.3 Commitment to the organization and it's goal is demonstrated in the performance of duties	1.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 1.2 Company policies 1.3 Company operations, procedures and standards 1.4 Fundamental rights at work including gender sensitivity 1.5 Personal hygiene practices	1.1 Appropriate practice of personal hygiene 1.2 Intra and Interpersonal skills 1.3 Communication skills
2. Set and meet work priorities	2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 Resources are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures	2.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 2.2 Company policies 2.3 Company operations, procedures and standards 2.4 Fundamental rights at work including gender sensitivity 2.5 Personal hygiene practices 2.6 Time management	2.1 Appropriate practice of personal hygiene 2.2 Intra and Interpersonal skills 2.3 Communication skills 2.4 <i>Managing goals and time</i>

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Maintain professional growth and development	3.1 <i>Trainings and career opportunities</i> are identified and availed of based on job requirements 3.2 <i>Recognitions</i> are sought/received and demonstrated as proof of career advancement 3.3 <i>Licenses and/or certifications</i> relevant to job and career are obtained and renewed	3.1 Work values and ethics (Code of Conduct, Code of Ethics, etc.) 3.2 Company policies 3.3 Company operations, procedures and standards 3.4 Fundamental rights at work including gender sensitivity 3.5 Personal hygiene practices	3.1 Appropriate practice of personal hygiene 3.2 Intra and Interpersonal skills 3.3 Communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations 4.4 Commendations 4.5 Awards 4.6 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
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 Simulation/Role-plays 3.4 Observation 3.5 Third Party Reports 3.6 Exams and Tests
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 OCCUPATIONAL HEALTH AND SAFETY PROCEDURES

UNIT CODE: : 500311108

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify hazards and risks	1.1 Safety regulations and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 Hazards/risks in the workplace and their corresponding indicators are identified to minimize or eliminate risk/exposure to ee workers, workplace and environment in accordance with organization's procedures 1.3 Contingency measures during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures	1.1 Occupational Safety and Health (OSH) procedures and practices and regulations 1.2 Personal hygiene practices 1.3 Hazards/risks identification and control 1.4 Organization safety and health protocol 1.5 Safety consciousness 1.6 Health consciousness	1.1 Practicing safety and health procedures and personal hygiene 1.2 Identifying hazards/risks and control 1.3 Interpersonal skills 1.4 Communication skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2 Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OSH issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OSH legislation	2.1 OSH procedures and practices and regulations 2.2 Personal hygiene practices 2.3 Hazards/risks identification and control 2.4 Threshold Limit Value -TLV 2.5 OSH indicators 2.6 Organization safety and health protocol 2.7 Safety consciousness 2.8 Health consciousness	2.1 Practicing personal hygiene 2.2 Identifying hazards/risks and control 2.3 Interpersonal skills 2.4 Communication skills
3 Control hazards and risks	3.1 Occupational Safety and Health (OSH) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OSH policies 3.3 Personal protective equipment (PPE) is correctly used in accordance with organization OSH procedures and practices	3.1 OSH procedures and practices and regulations 3.2 PPE types and uses 3.3 Personal hygiene practices 3.4 Hazards/risks identification and control 3.5 OSH indicators 3.6 Organization safety and health protocol 3.7 Safety consciousness 3.8 Health consciousness	3.1 Practicing personal hygiene 3.2 Identifying hazards/risks and control 3.3 Interpersonal skills 3.4 Communication skills

ELEMENT	PERFORMANCE CRITERIA <i>Italicized terms</i> are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	3.4 Appropriate assistance is provided in the event of a workplace emergency in accordance with established organization protocol		
4 Maintain OSH awareness	4.1 <i>Emergency-related drills and trainings</i> are participated in as per established organization guidelines and procedures 4.2 <i>OSH personal records</i> are completed and updated in accordance with workplace requirements	4.1 OSH procedures and practices and regulations 4.2 PPE types and uses 4.3 Personal hygiene practices 4.4 OSH indicators 4.5 Organization safety and health protocol 4.6 Safety consciousness 4.7 Health consciousness	4.1 Practicing personal hygiene 4.2 Interpersonal skills 4.3 Communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety and Health Regulations	May include but are not limited to: 1.1 Clean Air Act 1.2 National Building Code 1.3 Philippine Electrical Code 1.4 Fire Code of the Philippines 1.5 Waste management statutes and rules 1.6 Philippine Occupational Safety and Health Standards 1.7 DOLE OSH related issuances 1.8 ECC regulations
2. Hazards/Risks	May include but are not limited to: 2.1 Physical hazards – impact, illumination, pressure, noise, vibration temperature, radiation 2.2 Biological hazards - bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics <ul style="list-style-type: none"> • Physiological factors - over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles • Psychological factors - monotony, personal relationship, work out cycle

VARIABLE	RANGE
3. Contingency measures	May include but are not limited to: 3.1 Evacuation/ Rescue 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel
4. PPE	May include but are not limited to: 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits 4.9 Safety Helmet 4.10 Safety Shoes 4.11 Body Harness and lifeline
5. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management
6. OSH personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OSH-related training completed

EVIDENCE GUIDE

1. Critical aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Safety and Health (OSH) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OSH procedures and practices 1.7 Completed and updated OSH personal records in accordance with workplace requirements
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 OSH personal records 2.3 PPE 2.4 Health records
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation
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

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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variable	REQUIRED KNOWLEDGE	REQUIRED SKILLS
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 for 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 INSTRUCTIONS**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

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3 Apply information in manual	3.1 Manual 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 3.3 Unit conversion	3.1 Applying information from manuals
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 Instructions	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	Assessment requires that the candidate: 1.1 Identified and accessed specification/manuals as per job requirements 1.2 Interpreted manuals in accordance with industry practices 1.3 Applied information in manuals according to the given task 1.4 Stored manuals in accordance with company requirements
2. Resource implications	The following resources should be provided: 2.1 All manuals/catalogues relative to construction sector
3. Methods of assessment	Competency should be assessed through: 3.1 Direct observation 3.2 Questions/interview Assessment of underpinning knowledge and practical skills may be combined
4. Context of assessment	4.1 Competency assessment must be undertaken in accordance with the endorsed TESDA assessment guidelines 4.2 Assessment may be conducted in the workplace or a simulated environment

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

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 ohmeter 2.16 Kilowatt hour meter 2.17 Gauges 2.18 Thermometers

VARIABLE	RANGE
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>
3. 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>
4. 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 1.3 Operational conditions of plumbing tools and equipment 1.4 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
<p>2 Perform basic preventive maintenance</p>	<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	3.1 Inventory of tools, instruments and equipment are conducted and recorded as per company practices 3.2 Tools and equipment are stored safely in appropriate locations in accordance with manufacturer's specifications or company procedures	3.1 SAFETY PRACTICES 3.1.1 Use of PPE 3.1.2 Handling of tools and equipment 3.1.3 Storing procedures and techniques 3.1.4 Storage conditions/ locations	3.1 Storing tools and equipment 3.2 Handling of tools and equipment

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 OSHS 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 ESTIMATION OF MATERIALS FOR MULTIPLE PLUMBING UNITS

UNIT CODE : CON713318

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in estimating required materials for multiple plumbing units.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Study approved plumbing plan	1.1 All measurements in the plans are determined in accordance with job requirements and details. 1.2 Plumbing Legends, Symbols and abbreviations are identified and interpreted in accordance with job requirements. 1.3 Specification of materials are identified in the plan according to the job requirements. 1.4 Plumbing layout is determined/ visualized based on isometric drawing , schematic diagram and details. 1.5 When necessary, cost of materials are estimated based on the current market price.	1.1 ARITHMETIC 1.1.1 Linear measurement 1.1.2 Dimension 1.1.3 Unit conversion 1.2 BLUE-PRINT READING 1.2.1 Electrical, mechanical plan, symbols and abbreviations 1.3 TRADE THEORY 1.3.1 Basic technical plan 1.3.2 Various types of drawings 1.3.3 Notes and specifications 1.4 5S 1.5 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 1.6 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	1.1 Interpreting technical plan 1.2 Communication (written and verbal) 1.3 Applying Calculation techniques

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2 Estimate and finalize materials take-off	2.1 Materials are estimated in accordance with the job requirements. 2.2 Materials and consumables are quantified and listed in accordance with the job requirements. 2.3 All results are gathered and summarized for submission in accordance with job requirements 2.4 Bill of materials and cost estimate is presented to client / supervisor for approval	2.1 ARITHMETIC 2.1.1 Linear measurement 2.1.2 Dimension 2.1.3 Unit conversion 2.2 BLUE-PRINT READING 2.2.1 Electrical, mechanical plan, symbols and abbreviations 2.3 TRADE THEORY 2.3.1 Basic technical plan 2.3.2 Various types of drawings 2.3.3 Notes and specifications 2.4 5S 2.5 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 2.6 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	2.1 Interpreting technical plan 2.2 Communication (Written and verbal) 2.3 Applying estimation techniques 2.4 Applying calculation and computation

RANGE OF VARIABLES

VARIABLE	RANGE																																																								
1. Plans	May include: 1.1 Plumbing Plan 1.2 Structural Plan 1.3 Architectural plan 1.4 Site development plan 1.5 Mechanical Plan 1.6 Electrical Plan																																																								
2. Plumbing Legends, Symbols and abbreviation	<table border="1"> <thead> <tr> <th data-bbox="708 622 943 656">Symbols</th> <th data-bbox="943 622 1177 656">Legends</th> <th data-bbox="1177 622 1406 656">Abbreviations</th> </tr> </thead> <tbody> <tr> <td data-bbox="708 656 943 723"></td> <td data-bbox="943 656 1177 723">SOIL PIPE/ WASTE PIPE</td> <td data-bbox="1177 656 1406 723">SP / WP</td> </tr> <tr> <td data-bbox="708 723 943 790"></td> <td data-bbox="943 723 1177 790">VENT PIPE / VENT ABOVE CEILING</td> <td data-bbox="1177 723 1406 790">VP / VPAC</td> </tr> <tr> <td data-bbox="708 790 943 857"></td> <td data-bbox="943 790 1177 857">COLD WATER LINE</td> <td data-bbox="1177 790 1406 857">CWL</td> </tr> <tr> <td data-bbox="708 857 943 925"></td> <td data-bbox="943 857 1177 925">DRAIN PIPE</td> <td data-bbox="1177 857 1406 925">DP</td> </tr> <tr> <td data-bbox="708 925 943 992"></td> <td data-bbox="943 925 1177 992">GATE VALVE</td> <td data-bbox="1177 925 1406 992">GV</td> </tr> <tr> <td data-bbox="708 992 943 1059"></td> <td data-bbox="943 992 1177 1059">COUPLING/ CONCENTRIC REDUCER</td> <td data-bbox="1177 992 1406 1059">CR</td> </tr> <tr> <td data-bbox="708 1059 943 1126"></td> <td data-bbox="943 1059 1177 1126">SOIL STACK</td> <td data-bbox="1177 1059 1406 1126">SS</td> </tr> <tr> <td data-bbox="708 1126 943 1193"></td> <td data-bbox="943 1126 1177 1193">VENT STACK THRU ROOF</td> <td data-bbox="1177 1126 1406 1193">VSTR</td> </tr> <tr> <td data-bbox="708 1193 943 1261"></td> <td data-bbox="943 1193 1177 1261">COLD WATER RISER</td> <td data-bbox="1177 1193 1406 1261">CWR</td> </tr> <tr> <td data-bbox="708 1261 943 1328"></td> <td data-bbox="943 1261 1177 1328">FLOOR DRAIN (FLAT TYPE)</td> <td data-bbox="1177 1261 1406 1328">FD</td> </tr> <tr> <td data-bbox="708 1328 943 1395"></td> <td data-bbox="943 1328 1177 1395">WATER CLOSET</td> <td data-bbox="1177 1328 1406 1395">WC</td> </tr> <tr> <td data-bbox="708 1395 943 1462"></td> <td data-bbox="943 1395 1177 1462">LAVATORY</td> <td data-bbox="1177 1395 1406 1462">LAV</td> </tr> <tr> <td data-bbox="708 1462 943 1529"></td> <td data-bbox="943 1462 1177 1529">HOSE BIBB</td> <td data-bbox="1177 1462 1406 1529">HB</td> </tr> <tr> <td data-bbox="708 1529 943 1597"></td> <td data-bbox="943 1529 1177 1597">KITCHEN SINK</td> <td data-bbox="1177 1529 1406 1597">KSK</td> </tr> <tr> <td data-bbox="708 1597 943 1664"></td> <td data-bbox="943 1597 1177 1664">AREA DRAIN / CATCH BASIN</td> <td data-bbox="1177 1597 1406 1664">AD / CB</td> </tr> <tr> <td data-bbox="708 1664 943 1731"></td> <td data-bbox="943 1664 1177 1731">FLOAT VALVE</td> <td data-bbox="1177 1664 1406 1731">FV</td> </tr> <tr> <td data-bbox="708 1731 943 1798"></td> <td data-bbox="943 1731 1177 1798">CHECK VALVE</td> <td data-bbox="1177 1731 1406 1798">CV</td> </tr> </tbody> </table>	Symbols	Legends	Abbreviations		SOIL PIPE/ WASTE PIPE	SP / WP		VENT PIPE / VENT ABOVE CEILING	VP / VPAC		COLD WATER LINE	CWL		DRAIN PIPE	DP		GATE VALVE	GV		COUPLING/ CONCENTRIC REDUCER	CR		SOIL STACK	SS		VENT STACK THRU ROOF	VSTR		COLD WATER RISER	CWR		FLOOR DRAIN (FLAT TYPE)	FD		WATER CLOSET	WC		LAVATORY	LAV		HOSE BIBB	HB		KITCHEN SINK	KSK		AREA DRAIN / CATCH BASIN	AD / CB		FLOAT VALVE	FV		CHECK VALVE	CV		
Symbols	Legends	Abbreviations																																																							
	SOIL PIPE/ WASTE PIPE	SP / WP																																																							
	VENT PIPE / VENT ABOVE CEILING	VP / VPAC																																																							
	COLD WATER LINE	CWL																																																							
	DRAIN PIPE	DP																																																							
	GATE VALVE	GV																																																							
	COUPLING/ CONCENTRIC REDUCER	CR																																																							
	SOIL STACK	SS																																																							
	VENT STACK THRU ROOF	VSTR																																																							
	COLD WATER RISER	CWR																																																							
	FLOOR DRAIN (FLAT TYPE)	FD																																																							
	WATER CLOSET	WC																																																							
	LAVATORY	LAV																																																							
	HOSE BIBB	HB																																																							
	KITCHEN SINK	KSK																																																							
	AREA DRAIN / CATCH BASIN	AD / CB																																																							
	FLOAT VALVE	FV																																																							
	CHECK VALVE	CV																																																							
3. Drawing	May include: 3.1 Floor Plan 3.2 Schematic Diagram of Drain, Waste, and Vent (DWV) water line 3.3 Front View 3.4 Top View 3.5 Right Side / Left Side View 3.6 Section and Details 3.7 Drawing symbols																																																								

EVIDENCE GUIDE

1. Critical aspects of competency	<p>Assessment requires that the candidate:</p> <ul style="list-style-type: none"> 1.1 Studied approved blue-print plumbing plan 1.2 Ensured quality and economy in the selection of materials, tools and equipment 1.3 Finalized materials take - off 1.4 Included use of PPE in accordance with OSH standards in the estimation.
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Technical Plans and specifications 2.2 Tools and equipment for material estimation
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Direct Observation 3.2 Questions/Interview 3.3 Demonstration with oral questioning 3.4 Written examination
4. Context of Assessment	<ul style="list-style-type: none"> 4.1 Competency assessment may occur in the workplace or in any appropriate simulated environment 4.2 Assessment shall be observed while task are being undertake individually.

5.

UNIT OF COMPETENCY	:	PERFORM MULTIPLE PLUMBING UNITS INSTALLATION AND ASSEMBLIES
UNIT CODE	:	CON713312
UNIT DESCRIPTOR	:	This unit covers the knowledge, skills and attitudes in installing/assembling multiple units of plumbing in all types of building occupancy.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare materials for drainage, sanitary, vent and waterline layout work	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 5S 1.4 Use of plumbing materials, tools and equipment 1.5 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle)	1.1 Interpreting plan and details 1.2 Selecting and preparing appropriate materials, tools and equipment
2. Install pipes and fittings for drainage, sanitary, vent and waterline layout	2.1 Pipes and fittings are installed as indicated in the approved working plan 2.2 Pipe supports and braces are installed in accordance with the approved working plan 2.3 Correct use of materials, tools and equipment is observed in accordance with manufacturer's instruction manual. 2.4 Appropriate PPE is used in accordance with the job requirements	2.1 Mensuration 2.2 Blue print reading 2.3 Materials specification 2.4 5S 2.5 Use of plumbing materials, tools and equipment 2.6 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 2.7 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	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 markings 2.7 Applying measurement and mathematical computation

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Install cold water system and multi-point water heater for hot-water supply lines	3.1 Specifications of materials for hot and cold water piping used according to job requirements 3.2 Hot and cold water supply is installed according to the approved plan. 3.3 Water supply pipe assembled and installed is leak-free. 3.4 Proper use of tools and equipment is observed in accordance with manufacturer's instruction manual.	3.1 Mensuration 3.2 Blue print reading 3.3 Materials specification 3.4 5S 3.5 Use of plumbing materials, tools and equipment 3.6 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 3.7 DOLE Department Order No.13 s. 1998 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 markings 3.7 Applying measurement and mathematical computation
4. Install building drains, sewer and ventilation	4.1 Building drains/sewer and ventilation are installed in accordance to the approved plan. 4.2 Materials, tools and equipment are selected and prepared according to job requirements 4.3 Appropriate PPE are selected and used according to job requirements	4.1 Mensuration 4.2 Blue print reading 4.3 5S 4.4 Use of plumbing materials, tools and equipment 4.5 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 4.6 DOLE Department Order No.13 s. 1998 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 pipe connections 4.5 Applying markings

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
5. Mount and lay out plumbing fixtures and accessories	5.1 Specifications of plumbing fixtures are used in accordance with the job requirements. 5.2 Plumbing fixtures and accessories are installed according to specified roughing-in measurements and/or manufacturer's instruction manual. 5.3 Plumbing fixtures and accessories are rigidly secured with strict adherence to perpendicularity and levelness 5.4 Usage of tools and equipment is observed in accordance with manufacturer's specifications 5.5 Appropriate PPE are used in accordance with the job requirements 5.6 Work site is cleaned and kept in safe state and in accordance with Occupational Safety and Health Standards (OSHS)	5.1 Mensuration 5.2 Blue print reading 5.3 Materials specification 5.4 5S 5.5 Use of plumbing materials, tools and equipment 5.6 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 5.7 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	5.1 Interpreting plans and details 5.2 Handling of materials, tools and equipment 5.3 Communication (written and verbal) 5.4 Applying methods and techniques in various type of plumbing fixtures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Tools and equipment	May include: 1.1 Steel Tape 1.2 Ball-peen Hammer 1.3 Hacksaw with Blade 1.4 Blow Torch 1.5 Pointed Steel Chisel 1.6 Caulked Steel Chisel 1.7 Kettle 1.8 Manual Pipe Threader (1/4"-2") 1.9 Pipe Wrench (10", 12" & 14", 18", 24") 1.10 Pipe Vise (Chain or Yoke) 1.11 Bar or Hose level 1.12 Plumb bob 1.13 Pipe Cutter 1.14 Pipe Reamer 1.15 Threading Machine 1.16 Welding Machine 1.17 Test Pump (Manual or Power Driven) 1.18 Electric Drill 1.19 Cutting outfit set with oxygen/acetylene tank 1.20 Electric Grinder 1.21 Fusion Machine 1.22 Grooving machine 1.23 Pliers 1.24 Wrenches (open, box, combination, ajustable, socket, allen)
2. Personal Protective Equipment (PPE)	May include: 2.1 Safety Shoes 2.2 Hard Hat 2.3 Gloves 2.4 Goggles 2.5 Ear Muffs 2.6 Welding Mask / Face Shield 2.7 Uniform and I.D. 2.8 Apron/ Welding Gloves 2.9 Emergency medical kit 2.10 Full body harness/ safety belt 2.11 Dust mask

VARIABLE	RANGE
3. Pipes and Fittings	May include: 3.1 PVC Pipes and Fittings (DWV) 3.2 PPR Pipes and fittings 3.3 G.I. Pipes and Fittings 3.4 C. I Pipes and Fittings 3.5 PVC Blue Pressure Pipes and Fittings 3.6 Copper Pipes and fittings 3.7 HDPE Pipes and fittings
4. Plumbing Fixtures and Accessories	May include: 4.1 Water closet (flush tank/valve) Angle valve and Supply pipe 4.2 Lavatory with faucet, P-Trap, Angle Valve and supply pipe 4.3 Bath Tub including waste and overflow assembly 4.4 Shower head and valve assembly 4.5 Flushometer Valve 4.6 Electric Flushing devices (sensor) 4.7 Grease Trap 4.8 Instantaneous water heater 4.9 Bidet 4.10 Kitchen sink with faucet, P-Trap, Angle valve and supply pipe 4.11 Slop sink 4.12 Grab bar 4.13 Urinal 4.14 Toilet paper holder 4.15 Soap holder 4.16 Towel rack 4.17 Floor drain strainer 4.18 Faucet 4.19 Cleanout cover

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/plans in accordance with job requirements 1.2 Materials, tools and equipment selected and prepared according to job requirements 1.3 Installed pipes and fittings in accordance with the approved working plan and materials specifications 1.4 Installed hot- and cold-water supply according to the approved working plan and materials specifications 1.5 Installed building drains/sewer in accordance with approved working plan and materials specifications and followed standard slope requirements 1.6 Installed plumbing fixtures according to specified rough-in measurements and/or manufacturer's specifications and required standard in the RNPCP 1.7 Demonstrated compliance with safety regulations applicable to work site operations 1.8 Identified faults and problems that occur and made necessary action to rectify 1.9 Communicated interactively with others where applicable to ensure safe and effective work operations 1.10 Completed performing complex/multi-storey plumbing installation/assemblies within specifications
2. Resource Implications	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> 2.1 Workplace location 2.2 Tools and equipment appropriate to construction processes 2.3 Materials relevant to the proposed activity 2.4 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 of application to tasks 3.2 Questions related to required knowledge
4. Context for Assessment	<ul style="list-style-type: none"> 3.1 Competency may be assessed in the workplace or in a simulated workplace setting

UNIT OF COMPETENCY: CONDUCT PIPE LEAK TESTING**UNIT CODE : CON713310****UNIT DESCRIPTOR :** This unit covers the knowledge, skills and attitudes in conducting pipe leak testing.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Prepare for conducting pipe leak testing	1.1 Work instructions are read and interpreted in accordance with the job requirements 1.2 Materials, tools and equipment are selected and prepared in accordance with job requirements 1.3 All openings in the pipe system are tightly closed except the highest opening 1.4 Appropriate PPE are selected in accordance with job requirements	1.1 Mensuration 1.2 Blue print reading 1.3 Materials specification 1.4 5S 1.5 Use of plumbing materials, tools and equipment 1.6 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 1.7 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) 1.4 Applying methods and techniques in pipe leak testing

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Perform pipe leak testing	2.1 All openings in the pipe system are tightly closed except the highest opening prior to <i>leak testing</i> 2.2 Leak testing is applied after completion of roughing-ins and complete installation of pipe supports. 2.3 Testing apparatus is set to specified pressure rating according to testing standards. 2.4 Gravity or flood testing are applied to sanitary, waste, vent and storm drainage piping. 2.5 Pressure testing are applied to hot and cold water piping. 2.6 Correct usage of tools and equipment is observed in accordance with manufacturer's specifications 2.7 Appropriate PPE are used in accordance with job requirements 2.8 Work site is cleaned and kept in safe state and in accordance with OSHS	2.1 Blue print reading 2.2 5S 2.3 Use of plumbing materials, tools and equipment 2.4 Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 2.5 DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry	2.1 Interpreting plan and details 2.2 Handling of materials, tools and equipment 2.3 Communication (written and verbal) 2.4 Applying methods and techniques in pipe leak testing

RANGE OF VARIABLES

VARIABLE	RANGE
1. Materials	May Include: 1.1 Drum / Pail 1.2 Water 1.3 Plugs 1.4 Pipe system drawing 1.5 Rags 1.6 Water Hose 1.7 Teflon tape
2. Tools and equipment	May include: 2.1 Pipe wrench 2.2 Pipe threader 2.3 Pipe cutter 2.4 Manual / Electric test pump 2.5 Blow torch 2.6 Steel tape 2.7 Adjustable Wrench 2.8 Ballpeen hammer 2.9 Cold chisel 2.10 Hacksaw with blade 2.11 Set of Allen wrench 2.12 Screw Driver (Phillips and Flat) 2.13 Mechanical Plier 2.14 Vise Grip 2.15 Ladder / scaffolding 2.16 Flashlight / trouble light 2.17 Pressure Gauge
3. Personal protective equipment (PPE)	Must Include: 3.1 Gloves 3.2 Hard hat 3.3 Safety Shoes 3.4 Safety harness/ belt
4. Leak testing	May Include: 4.1 Water test 4.2 Testing by section 4.3 Air/smoke test 4.4 Gravity / flow test

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 in accordance with the job requirements 1.2 Selected and prepared materials, tools and equipment in accordance with job requirements 1.3 Performed pipe leak testing procedures/method in accordance with the job requirements 1.4 Applied organizational quality procedures and process within the context of conducting pipe leak testing procedures 1.5 Demonstrated compliance with safety regulations applicable to work site operations 1.6 Identified faults and problems that occur and take necessary action to rectify 1.7 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 Workplace location 2.2 Tools and equipment appropriate to construction processes 2.3 Materials relevant to the proposed activity 2.4 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 underpinning knowledge
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 PLUMBING REPAIR AND MAINTENANCE WORK

UNIT CODE : CON713311

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in repairing and maintaining plumbing works.

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Repair defective pipes, fittings and plumbing fixtures	1.1 Defective pipes, fittings and plumbing fixtures are identified, disconnected and replaced with the same model and in line with its original working condition 1.2 Replacements are checked and re-tested to ensure they are free from defects and in accordance with standard specification or as required 1.3 Joints are tightly secured and leak free in accordance with the job requirements 1.4 Damaged areas are restored or repaired in line with its original working condition 1.5 Correct usage of tools, equipment and consumables are observed in accordance with job requirements 1.6 Appropriate PPE are used in accordance with job requirements	1.1 Mensuration 1.2 Blueprint reading 1.3 Materials specification 1.4 5S 1.5 Use of materials, consumables, tools and equipment 1.6 Plumbing fixtures 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 plans and details 1.2 Replacing broken/defective pipes 1.3 Clearing clogged pipes and drainage 1.4 Handling of materials, tools and equipment 1.5 Communication (written and verbal) 1.6 Applying methods and techniques in repairing defective pipes, fittings and plumbing fixtures

ELEMENT	PERFORMANCE CRITERIA <i>Italicized</i> terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Clear clogged pipes and drains	2.1 Clogged pipes and drains are precisely identified in reference with the as- built plan. 2.2 Clogged pipes and drains are cleared using appropriate tools, equipment and methodology 2.3 Pipes and drain are cleared and provided with screen in line with original working condition 2.4 Appropriate PPE are used in accordance with the job requirements	2.1 Mensuration 2.2 Blueprint reading 2.3 5S 2.4 Use of tools and equipment 2.5 Environmental-conservation procedures e.g. 3R (reduce, reuse, recycle) 2.6 DOLE Department Order No. 13 s. 1998 (Guidelines Governing Occupational Safety and Health in the Construction Industry)	2.1 Interpreting plan and details 2.2 Handling of tools and equipment 2.3 Clearing clogged pipes and drains

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pipes and fittings	May include: 1.1 PVC/PE Pipe and fittings 1.2 PPR pipes and fittings 1.3 G.I. pipes and fittings 1.4 C.I. pipes and fittings 1.5 B.I. pipes and fittings 1.6 Tank fittings for water closet 1.7 Flush tank fittings for water closet 1.8 Sewer and drainage line 1.9 Water supply and distribution line 1.10 Riser and downfeed 1.11 Copper pipes and fittings
2. Plumbing fixtures	May include: 2.1 Lavatory with faucet, p-trap, angle valve and supply pipe 2.2 Bathtub with waste and overflow assembly 2.3 Shower valve 2.4 Flushometer valve 2.5 Shower heads 2.6 Electronic flushing devices (urinal, closet, faucet) 2.7 Water closet (flush tank/valve) , angle valve and supply pipe 2.8 Kitchen Sink 2.9 Bidet 2.10 Urinal 2.11 Grease Trap 2.12 Floor Drain Strainer 2.13 Clean-out cover 2.14 Water hammer arrester

VARIABLE	RANGE
3. Tools, equipment, and consumables	May include: <ul style="list-style-type: none"> 3.1 Pipe wrench 3.2 Pipe threader 3.3 Pipe cutter 3.4 Manual / Electric test pump 3.5 Hand drain cleaner 3.6 Blow torch 3.7 Steel tape 3.8 Adjustable Wrench 3.9 Ballpeen hammer 3.10 Cold chisel 3.11 Hacksaw with blade 3.12 Basin wrench 3.13 Strap wrench 3.14 Set of Allen wrench 3.15 Screw Driver (Philips and Flat) 3.16 Mechanical Plier 3.17 Vise Grip 3.18 Teflon Tapes 3.19 Rags 3.20 Solvent Cement
4. Personal protective equipment (PPE)	May include: <ul style="list-style-type: none"> 4.1 Gloves 4.2 Hard hat 4.3 Safety Shoes 4.4 Ear muff 4.5 Goggles 4.6 Face Shield 4.7 Safety Harness / belt 4.8 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 Selected and prepared materials, tools, equipment and consumables in accordance with job requirements 1.2 Identified, disconnected and repaired defective pipes, fittings and plumbing fixtures in accordance with standard specification or as required 1.3 Cleared clogged pipes and drains in line with SOPs 1.4 Demonstrated compliance with safety and environment regulations are applicable to work site operations 1.5 Identified faults and problems that occur and made necessary action to rectify 1.6 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 Workplace location 2.2 Tools and equipment appropriate to plumbing repair and maintenance work 2.3 Materials relevant to the proposed activity 2.4 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 underpinning knowledge
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

SECTION 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 skills 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: NC II

Nominal Training Duration: **18 Hours (Basic)**
 24 Hours (Common)
 160 Hours (Core)
 202 Hours

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 obtain complete the course, all units prescribed for this qualification must be achieved:

BASIC COMPETENCIES

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
1. Participate in workplace communication	1.1 Obtain and convey workplace information	<ul style="list-style-type: none"> • Effective communication • Different modes of communication • Written communication • Organizational policies • Communication procedures and systems • Technology relevant to the enterprise and the individual's work responsibilities • Sources of information • Types of question • Medium of communication • Flow of communication • Storage system • Telephone courtesy 	<ul style="list-style-type: none"> • Follow simple spoken language • Perform routine workplace duties following simple written notices • Participate in workplace meetings and discussions • Complete work related documents • Ability to relate to people of social range in the workplace • Gather and provide information in response to workplace requirements 	<ul style="list-style-type: none"> • Group discussion • Role Play • Demonstration 	<ul style="list-style-type: none"> • Oral Interview • Written test • Demonstration 	2 hours
	1.2 Complete relevant work related documents	<ul style="list-style-type: none"> • Communication procedures and systems • Meeting protocols • Nature of workplace meetings • Barriers of communication • Workplace interactions 	<ul style="list-style-type: none"> • Follow simple spoken language • Perform routine workplace duties following simple written notices • Participate in workplace meetings and discussions 	<ul style="list-style-type: none"> • Role Play • Demonstration 	<ul style="list-style-type: none"> • Observation • Oral Interview • Written test 	1 hour

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Non verbal communication 	<ul style="list-style-type: none"> • Complete work related documents • Estimate, calculate and record routine workplace measures • Basic mathematical processes of addition, subtraction, division and multiplication • Ability to relate to people of social range in the workplace • Gather and provide information in response to workplace requirements 			
	1.3 Participate in workplace meeting and discussion	<ul style="list-style-type: none"> • Technology relevant to the enterprise and the individual's work responsibilities • Types of workplace documents and forms • Basic mathematical concepts • Kinds of workplace report 	<ul style="list-style-type: none"> • Follow simple spoken language • Ability to relate to people of social range in the workplace • Gather and provide information in response to workplace requirements 	<ul style="list-style-type: none"> • Interaction • Demonstration 	<ul style="list-style-type: none"> • Observation • Oral Interview • Written test 	1 hour
2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team.	<ul style="list-style-type: none"> • Definition of Team • Difference between team and group • Different sources of information • Objectives and goals of 	<ul style="list-style-type: none"> • Describing the team role and scope 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • Demonstration • Observation 	2 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		team				2 hours
	2.2 Describe work as a team member	<ul style="list-style-type: none"> • Team goals and objectives • Fundamental rights at work including gender sensitivity • Understanding individual competencies relative to teamwork • Types of individuals • Role of leaders 	<ul style="list-style-type: none"> • Identifying individual role and responsibility • Identifying external relationship • Interacting effectively with others • Setting team goals and expectations 	<ul style="list-style-type: none"> • Interaction 	<ul style="list-style-type: none"> • Interviews/questioning • Demonstration 	
3. Practice career professionalism	3.1 Integrate personal objectives with organizational goals	<ul style="list-style-type: none"> • Work values and ethics (Code of Conduct, Code of Ethics, etc.) • Understanding personal objectives • Understanding organizational goals • Difference between intra and interpersonal relationship • Performance evaluation 	<ul style="list-style-type: none"> • Demonstrate Intra and Interpersonal skills at work • Demonstrate personal commitment in work 	<ul style="list-style-type: none"> • Discussion 	<ul style="list-style-type: none"> • Demonstration 	2 hours
	3.2 Set and meet work priorities	<ul style="list-style-type: none"> • Company policies • Company operations, procedures and standards 	<ul style="list-style-type: none"> • Managing goals and time • Practice economic use of resources and facilities 	<ul style="list-style-type: none"> • Interaction • Role Play 	<ul style="list-style-type: none"> • Observation • Demonstration 	2 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		<ul style="list-style-type: none"> • Time management • Basic strategic planning concepts • Resource utilization and management 	<ul style="list-style-type: none"> • Setting work priorities • Practice time management 			2 hours
	3.3 Maintain professional growth and development	<ul style="list-style-type: none"> • Career development opportunities • Company recognition and incentives • Information on relevant licenses and or certifications 	<ul style="list-style-type: none"> • Determining personal career development needs • Identifying career opportunities 	<ul style="list-style-type: none"> • Interaction • Role Play 	<ul style="list-style-type: none"> • Interviews/questioning 	
4. Practice occupational health and safety	4.1 Identify hazard and risks	<ul style="list-style-type: none"> • OSH procedures, practices and regulations • Hazards/risks identification and control • OSH indicators • Organizational contingency practices 	<ul style="list-style-type: none"> • Hazards/risks identification and control skills 	<ul style="list-style-type: none"> • Discussion • Plant tour • Symposium 	<ul style="list-style-type: none"> • Observation • Interview 	1 hour
	4.2 Evaluate hazard and risks	<ul style="list-style-type: none"> • Threshold Limit Value – TLV • Effects of safety hazards 	<ul style="list-style-type: none"> • Communication skills • Reporting safety hazards 	<ul style="list-style-type: none"> • Discussion • Plant tour 	<ul style="list-style-type: none"> • Observation • Interview 	1 hour
	4.3 Control hazards and risks	<ul style="list-style-type: none"> • Personal hygiene practices • Organization safety and health protocol • Company emergency procedure practices 	<ul style="list-style-type: none"> • Respond to emergency 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Portfolio assessment • Interview 	1 hour

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
	4.4 Maintain occupational health and safety awareness	<ul style="list-style-type: none"> • Workplace OSH personal records • Information on emergency-related drills 	<ul style="list-style-type: none"> • Practice emergency-related drill skills in the workplace 	<ul style="list-style-type: none"> • Discussion • Role-play • Simulation 	<ul style="list-style-type: none"> • Portfolio assessment • Interview 	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) 	1 hour
	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 	2 hours
2. Observe procedures, Specifications and Manuals of Instructions	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

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
	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
	2.3 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
	2.4 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

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
4. Maintain Tools and Equipment	4.1 Check condition of 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 • Materials, tools and equipment <ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> • Maintaining tools and equipment • Handling of tools and equipment • Identifying tools and equipment defects 	<ul style="list-style-type: none"> • Lecture-demonstration • Group discussion 	<ul style="list-style-type: none"> • Direct observation • Oral questioning 	3 hours
	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 	<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) 	3 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		maintenance - Methods and techniques - Procedures				2 hours
	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 <i>Lab</i> 	<ul style="list-style-type: none"> • Practical exam • Direct observation • Written test 	

CORE COMPETENCIES

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
1. Prepare estimation of materials for multiple plumbing units	1.1 Study approved plumbing plan	<ul style="list-style-type: none"> • Arithmetic <ul style="list-style-type: none"> - Linear measurement - Dimension - Unit conversion • Blue-print reading <ul style="list-style-type: none"> - Electrical, mechanical plan, symbols and abbreviations • Trade theory <ul style="list-style-type: none"> - Basic technical plan - Various types of drawings - Notes and 	<ul style="list-style-type: none"> • Interpreting technical plans • Relaying messages and information (written and verbal) • Applying Calculation techniques 	<ul style="list-style-type: none"> • Group discussion • Actual demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination 	16 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		specifications <ul style="list-style-type: none"> • Environmental conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry. 				20 hours
	1.2 Select materials and tools	<ul style="list-style-type: none"> • Arithmetic <ul style="list-style-type: none"> - Linear measurement - Dimension - Unit conversion • Blue-print reading <ul style="list-style-type: none"> - Electrical, mechanical plan, symbols and abbreviations 	<ul style="list-style-type: none"> • Interpreting technical plan • Relaying messages and information (written and verbal) 	<ul style="list-style-type: none"> • Group discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination 	20 hours
	1.3 Finalize materials take-off	<ul style="list-style-type: none"> • Trade theory <ul style="list-style-type: none"> - Basic technical plan - Various types of drawings - Notes and specifications • 5S • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 	<ul style="list-style-type: none"> • Applying estimation techniques • Applying calculation and computation 	<ul style="list-style-type: none"> • Group discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination 	

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		Guidelines Governing Occupational Safety and Health in the Construction Industry				
2. Perform multiple units of plumbing installation and assemblies	2.1 Prepare materials for drainage, sanitary, vent and waterline layout works	<ul style="list-style-type: none"> • Blue print reading • Materials specification • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) 	<ul style="list-style-type: none"> • Interpreting plan and details • Selecting and preparing appropriate materials, tools and equipment 	<ul style="list-style-type: none"> • Discussion • Demonstration • 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	8 hours
	2.2 Install pipes and fittings for drainage, sanitary, vent and waterline layout	<ul style="list-style-type: none"> • Mensuration • Blue print reading • Materials specification • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Interpreting plans and details • Handling of materials, tools and equipment • Communication (written and verbal) • Applying methods and techniques in various type of pipe connections • Cutting and threading pipes • Applying markings • Applying measurement and mathematical computation 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	12 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
	2.3 Install cold water system and multipoint water heater for hot water supply lines	<ul style="list-style-type: none"> • Mensuration • Blue print reading • Materials specification • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No.13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Interpreting plans and details • Handling of materials, tools and equipment • Communication (written and Verbal) • Applying methods and techniques in various type of pipe connections • Cutting and threading pipes • Applying markings • Applying measurement and mathematical computation 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	12 hours
	2.4 Install building drains, sewer and ventilation	<ul style="list-style-type: none"> • Mensuration • Blue print reading • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the 	<ul style="list-style-type: none"> • Interpreting plans and details • Handling of materials, tools and equipment • Communication (written and verbal) • Applying methods and techniques in various type of pipe connections • Applying markings 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	12 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		Construction Industry				12 hours
	2.5 Mount and layout plumbing fixtures and accessories	<ul style="list-style-type: none"> • Mensuration • Blue print reading • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Interpreting plans and details • Handling of materials, tools and equipment • Communication (written and verbal) • Applying methods and techniques in various type of plumbing fixtures 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	
3. Conduct pipe leak testing	3.1 Prepare for conducting pipe leak testing	<ul style="list-style-type: none"> • Mensuration • Blue print reading • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the 	<ul style="list-style-type: none"> • Interpreting plan and details • Handling of materials, tools and equipment • Communication (written and verbal) • Applying methods and techniques in pipe leak testing 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	12 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		Construction Industry				
	3.2 Perform pipe leak testing	<ul style="list-style-type: none"> • Blue print reading • 5S • Use of plumbing materials, tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Interpreting plan and details • Handling of materials, tools and equipment • Communication (written and verbal) • Applying methods and techniques in pipe leak testing 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	12 hours
4. Perform plumbing repair and maintenance works	4.1 Repair defective pipes, fittings and plumbing fixtures	<ul style="list-style-type: none"> • Mensuration • Blue print reading • 5S • Use of materials, consumables, tools and equipment • Plumbing fixtures • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the 	<ul style="list-style-type: none"> • Interpreting plans and details • Replacing broken/defective pipes • Clearing clogged pipes and drainage • Handling of materials, tools and equipment • Communication (written and verbal) • Applying methods and techniques in repairing defective pipes, fittings and plumbing fixtures 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	12 hours

Unit of Competency	Learning Outcomes	Learning Contents	Practical Activities	Methodologies	Assessment Methods	Nominal Duration
		Construction Industry				12 hours
	4.2 Clear clogged pipe and drains	<ul style="list-style-type: none"> • Mensuration • Blue print reading • 5S • Use of tools and equipment • Environmental-conservation procedures, e.g. 3R (reduce, reuse, recycle) • DOLE Department Order No. 13 s. 1998 Guidelines Governing Occupational Safety and Health in the Construction Industry 	<ul style="list-style-type: none"> • Interpreting plan and details • Handling of tools and equipment • Clearing clogged pipes and drains 	<ul style="list-style-type: none"> • Discussion • Demonstration 	<ul style="list-style-type: none"> • Observation • Written and Oral Examination • Demonstration 	

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 craftsperson wherein the agreement may be written or oral and the master craftsperson 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 craftsperson.
- **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 – 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 Senior High School (Grade 11 & 12) level or graduate;
 - Holder of Plumbing NC I or relevant industry experience (plumbing works) for a minimum of 2 years* in all of the following:
 - Prepare Plumbing Layout
 - Make Piping Joints and Connections
 - Perform Minor Construction Works
 - Install and Assemble Single Plumbing Unit
- Note: * Certified by the employer or a Registered Master Plumber
- Able to communicate orally and in writing
 - Can perform basic mathematical computations

This list does not include specific institutional requirements such as written entrance exam, 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 PLUMBING NC II

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

TOOLS					
Qty	Description	Qty	Description	Qty	Description
6 pcs.	Pipe wrench (2 pcs each sizes 10", 12", 14")	4 units	Pipe Vise 1" – 4" (2 Yoke vise and 2 chain vise)	5 pcs	Mechanical Plier
5 pcs.	Pressure gauges (3" dia. X ¼" dia. 0-300 psi)	5 pcs.	Pipe Cutter ½" – 2"	6 pcs	Adjustable wrench (3each 10" & 12")
25 pcs.	Steel Tape (5m)	25 pcs.	Ballpeen Hammer	5 pcs.	Flat Screw Driver 10"
25 pcs	Hacksaw with Blade	25 pcs	Pointed Cold Chisel (various length 10" -12")	5 pcs.	Philip Screw Driver 10"
5 pcs.	Spirit level bar 24" length	5 pcs.	Electrical Plier	25 pcs	Cold Chisel (var. lengths 8"-12" dia. 5/8")
5 units	Pipe Reamer	5 pcs	Plumb Bob (Std. size)		
EQUIPMENT					
Qty	Description	Qty	Description	Qty	Description
1 unit	Threading Machine complete with the following 220 V 2 units Die head 2 sets dies (1/2" & ¾" – 1" – 2") 1 pc pipe reamer 1 pc pipe cutter	1 set	Cutting outfit set (Harris or Morris) with oxygen / acetylene cylinder with gas content (refillable)	1 unit	Welding machine 300 amperes with grounding and extension cable, electrode holder and welding mask.
2 units	Fusion Machine (20mm – 32mm)	2 units	Electric Grinder (4")	1 unit	Electric Test Pump
2 units	Electric Drill (drill bit ¼" – 5/8")	1 unit	Push Drill ¼" – 5/8" size	5 units	Blow Torch
2 units	Manual Test Pump	5 cylind ers	Portable Soldering Kit	1 unit	Cut-off machine (14" dia. cutting disc)
MATERIALS and CONSUMABLES					
Qty	Description	Qty	Description	Qty	Description
SANITARY, WASTE AND VENT SYSTEM		COLD WATER SUPPLY AND DISTRIBUTION PIPING		CONSUMABLES	
8 lengths	PVC Pipe 6" m x 3m s-1000	PVC BLUE PIPES AND FITTINGS		6 sets	Plumbing Blue - print plan
16	PVC Pipe 4" m x 3m	5 pcs.	PVC Blue pipe 1" x 3	6 pcs	Paint brush 9 3 each,

lengths	s-1000		mtrs.		1" & 1 1/2")
5 lengths	PVC Pipe 3"m x 3"m s-1000	5 pcs.	PVC Tee Reducer 1" x 1/2"	10 sheets	Sand Paper (12" x 12" rough)
30 length	PVC Pipe 2"m x 3"m s-1000	25 pcs	PVC Blue Pipe 1/2" x 10'	6 pcs	Chalk Stone
5 pcs	PVC Wye 6" x 4"	150 pcs	PVC Tee 1/2" x 1/2"	1 pad	Writing Paper
12 pcs	PVC Wye 4" x 4"	150 pcs	PVC Tee Female 1/2" x 1/2"	2 kls	Welding Rod (each 6011 and 6013 x 1/8"
15 pcs	PVC Wye 4" x 2"	150 pcs	PVC Elbow 1/2" x 90°	2 kls	G.I. Wire # 18
10 pcs	PVC Tee 4" x 2"	75 pcs	PVC Elbow Female 1/2" x 90°	PPR PIPES AND FITTINGS	
40 pcs	PVC Tee 2" x 2"	75 pcs	PVC Cap 1/2"	5 pcs	PPR Pipe 32mm x 4 mtrs.
12 pcs	PVC Elbow 4" x 90°	100 pcs	PVC Male Adapter 1/2"	25 pcs	PPR Pipes 20mm x 20mm
35 pcs	PVC Elbow 2" x 90°	100 pcs	PVC Female Adapter 1/2"	25 pcs	PPR Gate Valve 20mm
10 pcs	PVC Elbow 4" x 45°	150 rolls	Teflon Tape	150 pcs	PPR Tee Equal 20mm x 20mm
20 pcs	PVC Elbow 2" x 45°	200 pcs	G.I Plug 1/2"	225 pcs	PPR Tee Female 20mm x 1/2"
5 pcs	PVC Elbow 3" x 90°	25 pcs	Gate Valve 1/2" Screwed Type	150 pcs	PPR Equal Elbow 20mm x 90°
15 pcs	PVC P- Trap 2"	G.I. PIPES AND FITTINGS		75 pcs	PPR Elbow Female 20mm x 1/2" x 90°
5 pcs	PVC Cleanout 4"	5 pcs	G.I. Pipe 1" x 6 mtrs.	75 pcs	PPR End Cap 20mm
4 cans	PVC Solvent Cement 400cc	5 pcs.	G.I. Tee Reducer 1" x 1/2"	150 pcs	PPR Male Adapter 1/2"
5 unit	PVC Wye 4" x 3"	13 pcs	G.I. Pipe 1/2" x 20 sch. 40	150 pcs	PPR Female Adapter 1/2"
10 pcs	PVC Wye 3" x 2"	25 pcs	Gate Valve 1/2" - Screwed Type	5 pcs.	PPR Tee Reducer 32mm x 20mm
10 pcs	PVC Elbow 3" x 45°	75 pcs	G.I. Tee 1/2" x 1/2"	25 pcs.	Single shower valve
5 pcs	PVC Cleanout 3"	100 pcs	G.I. Elbow 1/2" x 90°		
		75 pcs	G.I. Cap 1/2"		
		175 pcs	G.I. Plug 1/2"		
PLUMBING FIXTURES					
5 units	Water Meter	1 set	Bath Tub with complete fittings		
5 units	Water Closet (Flush Tank) with Bidet	1 set	Urinal with push-button or flush valve and		

	Spray		complete fittings		
5 sets	Lavatory with faucet	2 units	Grease trap, 4 gpm capacity		
5 sets	Kitchen Sink with faucet				
2 units	Multipoint water heater				
15 pcs	Floor drains				
10 sets	Faucets				

3.5 TRAINING FACILITIES

Based on a class intake of 25 students/trainees

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 II or higher NC Level
- Preferably a Registered Master Plumber;
- Preferably with a minimum of 3 years relevant industry experience * (plumbing works) in all of the following:
 - Prepare estimation of materials for multiple plumbing units
 - Perform Multiple units of Plumbing Installation and Assemblies
 - Conduct pipe leak testing
 - Perform plumbing repair and maintenance works

Note: * Certified by the employer or Registered Master Plumber
- Must have completed the 40-Hour Construction Safety Training Course (COSH) as per (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

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 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 relevant competency standards.

The assessment process is based on evidence or information gathered to prove achievement of competencies. The process may be applied to an 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 II as follows:

BASIC COMPETENCIES
Participate in workplace communication
Work in a team environment
Practice career professionalism
Practice occupational health and safety procedures
COMMON COMPETENCIES
Prepare construction materials and tools
Observe procedures, specifications and manuals of instruction
Perform mensurations and calculations
Maintain tools and equipment
CORE COMPETENCIES
Prepare estimation of materials for multiple plumbing units
Perform multiple units of plumbing installation and assemblies
Conduct pipe leak testing
Perform plumbing repair and maintenance works

- 4.12 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.

4.13 Candidates applying for competency assessment and certification for Plumbing NC II 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 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`

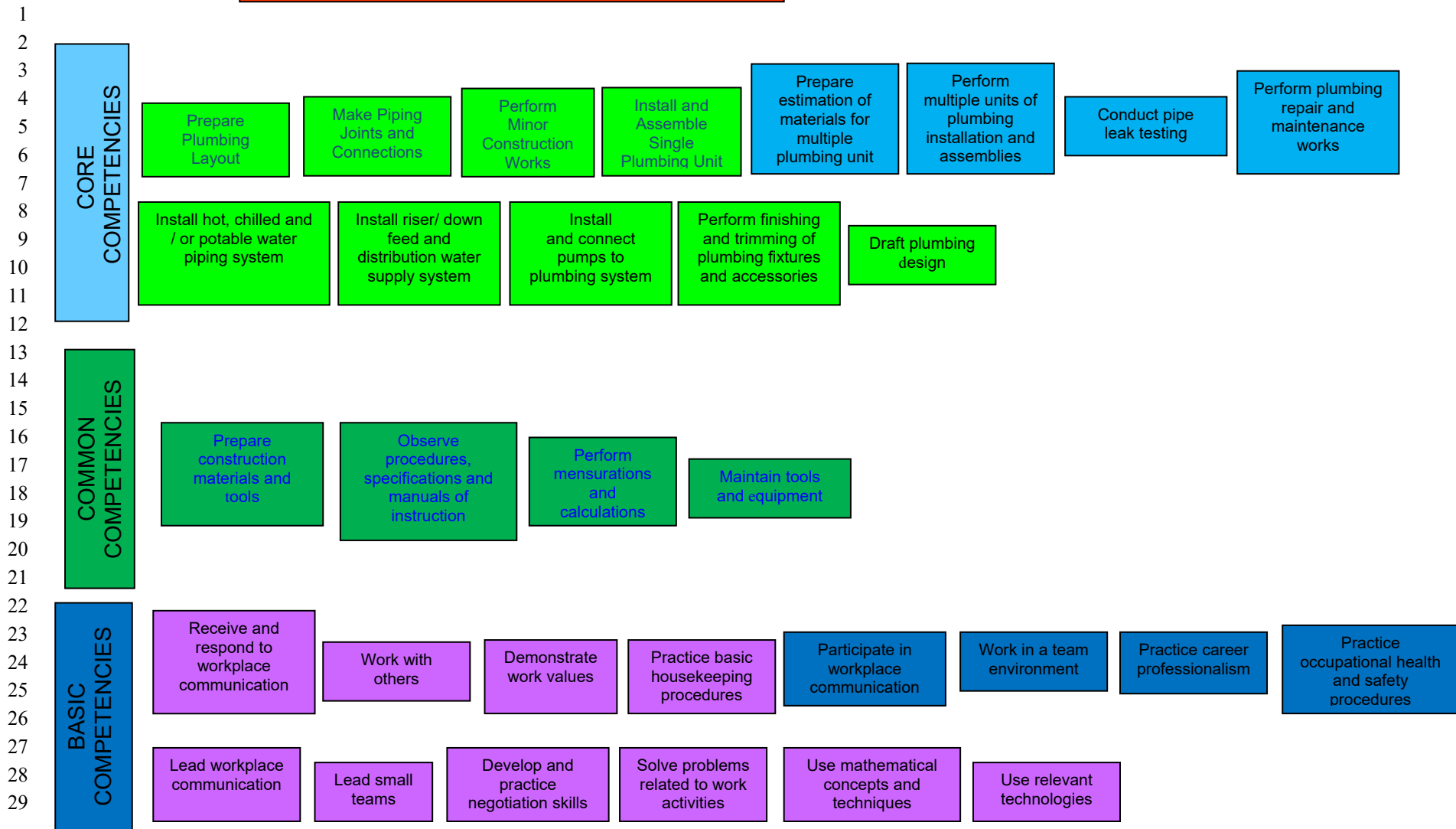
4.2.2 Accredited Assessment Center. Only Assessment Center accredited by TESDA is authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.

4.2.3 Accredited Competency Assessor. Only accredited competency assessor is authorized to conduct assessment of competence. Competency assessors undergo a quality assured system of accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

COMPETENCY MAP CONSTRUCTION PLUMBING SUB-SECTOR

PLUMBING NC II

ANNEX A



DEFINITION OF TERMS

1. **Pipe** – is 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.
2. **Plumbing** – 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
3. **Plumbing appliance** – is 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
4. **Plumbing appurtenance** – 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
5. **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
- 6) **Plumbing system** – includes 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

- 7) **Plumbing unit** – is 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
- 8) **Potable water** – is a water satisfactory for drinking, culinary and domestic purposes and meets the requirements of the Philippine National Standards for Drinking Water
- 9) **Pressure** – is the normal force exerted by a homogenous liquid or gas, per unit of area on the wall of the container
- 10) **Un-plasticized Polyvinyl Chloride Conduit (uPVC)** - is a non-metallic conduit into which electrical wire may be drawn and with an outside diameter sufficiently different from that of metallic conduit
- 11) **Complex Plumbing** - Covers the knowledge, skills and attitudes in installing/assembling plumbing installation in all types of building occupancy that requires special and extra ordinary piping system.
- 12) **Multiple Plumbing System** - a battery of fixture; composed of two or more system connections
- 13) **Centralized Plumbing Hot water** - is a system that supplies or distribute hot water to multiple fixtures that requires hot water using storage type water heater and boilers
- 14) **High-rise building** - multi-storey building minimum of 15 storey and above
- 15) **Medium-rise building** - multi - level storey building from ground floor to 15 story building

ACKNOWLEDGEMENTS

The Technical Education and Skills Development Authority (TESDA) wishes to thank the following persons from ***Philippine Society of Plumbing Engineers (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)

MR. ALBERTO T. CABAE

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

Journeymen 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

Former Chairman- Board of Master
Plumber
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. MARVIN B. ADRIANO

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

MR. JUDY F. PASTORPEDE

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

MR. MAXIMINO C. BUTLIG

CONICAL CONSTRUCTION INC.
(Plumber)
71 K 47th St. Kamuning, Quezon City

MR. JESSIE M. MARIANO
Former – Board of Master Plumbing
Professional Regulation Commission
Cell. No.: (0917) 5102355

MR. FRANCIS LUIS C. DE GUZMAN
Megapipe Builders Inc.
Tel. No. 234-1927

MR. EDGAR S. ESTRADA
Pasig City Engineering Office
Tel. No.: (02)628-1783

MR. RODRIGO M. TAGLE
Plumbing Enforcement Section
Makati City Hall
Tel. No. (02) 870-1214

MR. JUSTO T. FEROLINO
Plumbing Assessor
Cell. No.: (0998)4018930

MR. RONALD P. PEÑA
Professor
Cavite State University
Tel. No.: (046) 862-7237

Members of the TESDA Board

TESDA EXCOM

The MANAGEMENT and STAFF of the TESDA Secretariat

TESDA - Qualification and Standards Office (QSO)