COMPETENCY STANDARDS & ASSESSMENT GUIDE
FOR
PLUMBING

Skills for Employment Investment Program (SEIP)
Finance Division, Ministry of Finance

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The Competency Standards for Plumbing is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing trainings consistent with the requirement of industry in order for individuals who passed through the set standard via assessment would be qualified and settled for a relevant job.

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INTRODUCTION:

The Skills for Employment Investment Program (SEIP) Project of the Finance Division of the Ministry of Finance has embarked on a project which aims to qualitatively and quantitatively expand the skilling capacity of identified public and private training providers by establishing and operationalizing a responsive skill eco system and delivery mechanism through a combination of well-defined set of funding triggers and targeted capacity support.

Among the many components of the project, one is to promote a Market Responsive Inclusive Skills Training Delivery program. Key priority economic growth sectors identified by government have been targeted by the project to improve current job skills along with up-skilling of the existing workforce to ensure 'required skills to industry standards'. Training providers are encouraged and supported to work with the industry to address identified skills to enable industry growth and increased employment through the provision of market responsive inclusive skills training programs. Priority sectors were identified to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISCs), Employer Associations and Employers.

This document is developed to improve skills in accordance with the job roles and skill sets of the occupation and ensure that the required skills are aligned to industry requirements.

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

OVERVIEW:

A **Competency Standard** is a written specification of the knowledge, skills and attitudes required for the performance of a job or occupation or trade corresponding to the standard of performance required in the workplace.
Competency standard:
- provides a consistent and reliable set of components for training, recognizing and assessing people's skills, and may also have optional support materials.
- enables industry recognized qualifications to be awarded through direct assessment of workplace competencies
- encourages the development and delivery of flexible training which suits individual and industry requirements
- encourages learning and assessment in a work-related environment which leads to verifiable workplace outcomes.

Competency Standards are developed by a working group who comprised of national and international process experts and the participation of experts from the industry to identify the competencies required of an occupation in a particular sector.

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

With Competency Standards, assessment and training may be conducted at the workplace, at training organization, during regular work, or through work experience, work placement, work simulation or any combination of these.

A Unit of Competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of Competency are documented in a standard format that comprises:
- Reference to Industry Sector, Occupational Title and Occupational Description
- Unit code
- Unit title
- Unit descriptor
- Unit of Competency
- Elements and performance criteria
- Variables and range statement
- Evidence guides

Together all the parts of a Unit of Competency:
- Describe a work activity
- Guide the assessor in determining whether the candidate is competent.

Identification and validation of units of competency and elements for each occupation were made by experts of various construction companies in an industry consultative workshop held at the Bangladesh Association of Construction Industry (BACI) on the 14th of February 2016.

Profile of experts and facilitators who participated in the Competency Verification and Validation Workshop are given below.

Competency Verification-Validation Experts/Participants:

Name	Company	Job Position
Mr. Nibir Kanti Sarker	Project Builders Ltd(PBL)	Head, Machinery Division
Mr. Faysoluzzaman	Diligent Engineers	Project Engineer
Md. Samin Yasar	Building Design & Consultant	Site Engineer
Md. Monirul Islam	National Development Engineers	Project Engineer
Md. Jalal Mia	Atlanta group of industries	Manager
Engr. Dilip Kumar Sarker	Project Builders Ltd(PBL)	Deputy Chief engineer
Md. Mohiuddin Ahmed	Samsuddin Mia & Associates Ltd.	Sr. Site Engineer
Md. Amanulla	Engineer foundation &Consultant	Sr. Engineer
Md. Khairuzzaman Mia	Asset development and holding Ltd.	Sr. Project Engineer
Md. Majed Ali	Asset Development & holding	Sr. Project Engineer

Workshop Facilitators:

Mr. Emeterio Cedillo, Jr.	SEIP	International Specialist
Mr. Md. Mohiuzzaman	SEIP	Course Specialist
Mr. Nuruzzaman	SEIP	National Specialist

Another competency verification workshop with the participation of industry experts, trainers and the experts from BTEB was held at the SDCMU conference room on 29 August 2016 to further verify and revalidate the units of competencies, performance criteria, range of variables, learning sequence and quality of learning provision. The names of the experts, trainers and the representative are shown below:

Competency Verification-Validation Experts/Participants:

Name	Company	Job Position
Mr Shahidul Islam	Bangladesh- German Technical Training Centre	Senior Instructor
Mr Masud Rana	MAWTS	Instructor
Mr. Moniruzzaman	MAWTS	Instructor
Dr. Md Shah Alam	Bangladesh Technical Education Board	Specialist (Course Accreditation)
Dr Md Abul Kalam Azad	Directorate of Technical Education	Project Officer
Mr M. Shamsul Hoque	Shams Engineering	Managing Director

Workshop Facilitators:

Mr Syed Nasir Ershad	SEIP	AEDP
Mr Md. Ahasan Habib	SEIP	TVET Specialist
Mr. Md Mohiuzzaman	SEIP	Course Specialist

The ensuing sections of this document comprise a description of the respective occupation with all the key components of a Unit of Competence:

- An overview of all Units of Competence for the occupation and their corresponding duration required for completion of training.

- The Competency Standards that include the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

COMPETENCY PROFILE/CHART FOR
PLUMBING

UNITS OF COMPETENCY	**ELEMENTS**

A. Generic (Basic) Competencies

PERFORM COMPUTATIONS USING BASIC MATHEMATICAL CONCEPTS (SEIP-CON-PLU-1-G)	Identify calculation requirements in the workplace.	Select appropriate mathematical methods/concepts for the calculation	Use tool/instrument to perform calculations
APPLY OCCUPATIONAL HEALTH AND SAFETY (OH&S) PRACTICES IN THE WORKPLACE (SEIP-CON-PLU-2-G)	Identify OHS policies and procedures	Apply personal health and safety practices	Report hazards and risks	Respond to emergencies
COMMUNICATE IN ENGLISH IN THE WORKPLACE (SEIP-CON-PLU-3-G)	Read and understand workplace documents in English	Write simple workplace written communications in English.	Listen and comprehend to English conversation	Perform conversations in English language
OPERATE IN A SELF-DIRECTED TEAM. (SEIP-CON-PLU-4-G)	Identify team goals and processes.	Communicate and cooperate with team members.	Work as a team member	Solve problems as a team member

B. Sector Specific (Common) Competencies

TRANSLATE DRAWINGS, PLANS AND SPECIFICATIONS (SEIP-CON-PLU-1-S)	Access information from manuals, designs and plans	Interpret drawings and specifications from manuals, designs and plans	Store manuals, designs and plans	
WORK WITH HAND TOOLS AND POWER TOOLS (SEIP-CON-PLU-2-S)	Inspect hand tools and power tools for usability	Use hand tools properly and safely	Operate power tools properly and safely	Clean/maintain hand tools and power tools after use
CARRY OUT MEASUREMENTS AND CALCULATIONS (SEIP-CON-PLU-2-S)	Check usability of measuring devices	Carry out accurate construction work measurements	Execute simple construction work calculations	Clean and maintain measuring instruments

C. Occupation Specific (Course) Competencies

PERFORM PIPE THREADING OPERATION (SEIP-CON-PLU-1-O)	Gather and check tools, equipment and materials	Carry out steel pipe cutting operation	Carry out thread cutting operation	Assemble pipe run

	Clean/maintain the work area			
PERFORM ACCESS CUTTING AND ENCROACHMENT WORKS (SEIP-CON-PLU-2-O)	Interpret drawings and plumbing plans	Inspect encroachment work area	Gather tools, equipment and materials	Cut and make access through walls and floors
	Clean/maintain the workplace			
CARRY OUT WATER SUPPLY LINE INSTALLATION USING G.I., PPR and HDPE PIPES (SEIP-CON-PLU-3-O)	Gather and inspect tools, equipment and materials	Perform G.I., PPR, HDPE pipe cutting operation	Perform G.I. ., PPR, HDPE Pipe threading operation	Assemble G.I., PPR, HDPE pipe runs
	Clean/maintain the work area			
CARRY OUT WATER SUPPLY LINE INSTALLATION USING PVC/UPVC PIPES (SEIP-CON-PLU-4-O)	Gather and inspect tools, equipment and materials	Perform PVC/UPVC pipe cutting operation	Perform PVC/UPVC pipe run Assembly	Clean/maintain the work area
CARRY OUT SEWER PIPE LINE INSTALLATION (SEIP-CON-PLU-5-O)	Plan out for sewer pipe line installation	Gather tools, equipment and materials	Carry out trenching and bedding works	Lay sewer pipe
	Finish final pipe run	Clean/maintain work area		
CARRY OUT PLUMBING FIXTURES INSTALLATION (SEIP-CON-PLU-6-O)	Prepare for plumbing fixture installation	Gather tools, equipment and materials	Install a new toilet bowl (commode)	Install other plumbing fixtures
	Clean/maintain the work area			
PERFORM PRESSURE TESTING OF PIPING SYSTEM (SEIP-CON-PLU-7-O)	Prepare for pressure testing	Gather tools, equipment and materials	Carry out pressure testing	Clean/maintain the work area

Units & Elements at Glance:

Generic (Basic) Competencies (46 hrs.)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SEIP-CON-PLU-1-G	Perform Computations Using Basic Mathematical Concepts	1. Identify calculation requirements in the workplace 2. Select appropriate mathematical methods/concepts for the calculation. 3. Use tool/instrument to perform calculations	14
SEIP-CON-PLU-2-G	Apply Occupational Health and Safety (OHS) Practices in the Workplace	1. Identify OHS policies and procedures 2. Apply personal health and safety practices 3. Report hazards and risks 4. Respond to emergencies	10
SEIP-CON-PLU-3-G	Communicate in English in the Workplace	1.Interpret workplace documents in English 2. Write simple workplace communications in English 3.Listen and comprehend to English conversations 4. Perform conversations in English language	14
SEIP-CON-PLU-4-G	Operate in a Self-Directed Team	1. Identify team goals and work processes 2. Communicate and cooperate with team members. 3. Work as a team member. 4. Solve problems as a team member	8
Total Hour			46

Sector Specific (Common) Competencies (64 hrs.)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SEIP-CON-PLU-1-S	Translate Drawings, Plans and Specifications	1. Access information from manuals, designs and plans 2. Interpret drawings and specifications from manuals, designs and plans 3. Store manuals, designs and plans	10
SEIP-CON-PLU-2-S	Work with Hand Tools and Power Tools	1. Inspect hand tools and power tools for usability 2. Use hand tools properly and safely	10

		3. Operate power tools properly and safely	
		4. Clean/maintain hand tools and power tools after use	
SEIP-CON-PLU-3-S	Carry Out Measurements and Calculations	1. Check usability of measuring devices 2. Carry out accurate construction work measurements 3. Execute simple construction work calculations 4.Clean and maintain measuring instruments	16
Total Hour			36

Occupation Specific (Core) Competencies (278 hrs.)

Code	Unit of Competency	Elements of Competency	Duration (Hours)
SEIP-CON-PLU-1-O	Perform Pipe Threading Operation	1.Gather and check tools, equipment and materials 2. Carry out steel pipe cutting operation 3. Carry out thread cutting operation 4. Assemble pipe run 5. Clean/maintain the work area)	40
SEIP-CON-PLU-2-0	Carry Out Water Supply Line Installation Using G.I., PPR and HDPE Pipes	1. Interpret drawings and plumbing plans 2. Inspect encroachment work area 3. Gather tools, equipment and materials 4. Cut and make access through walls and floors 5. Clean/maintain the work area	32
SEIP-CON-PLU-3-O	Carry Out Water Supply Line Installation Using G.I., PPR and HDPE Pipes	1. Gather and inspect tools, equipment and materials 2. Perform pipe cutting operation 3. Perform Pipe threading operation 4. Assemble pipe runs 5. Clean/maintain the work area	50
SEIP-CON-PLU-4-O	Carry Out Water Supply Line Installation Using PVC /UPVC Pipes	1. Gather and inspect tools, equipment and materials 2. Perform PVC/UPVC pipe cutting operation 3. Perform PVC/UPVC pipe run assembly 4. Clean/maintain the work area	44
SEIP-CON-PLU-5-O	Carry Out Sewer Pipe Line Installation	1.Plan out for sewer pipe line installation 2. Gather tools, equipment and materials 3. Carry out trenching and bedding works 4. Lay sewer pipe 5. Finish final pipe run 6. Clean/maintain the work area	28
SEIP-CON-PLU-6-O	Carry Out Plumbing Fixtures Installation	1.Prepare for plumbing fixture installation 2. Gather tools, equipment and materials 3. Install a new toilet bowl (commode) 4. Install other plumbing fixtures 5.Clean/maintain the work area	60
SEIP-CON-PLU-7-O	Perform Pressure Testing of Piping System	1.Prepare for pressure testing 2. Gather tools, equipment and materials 3. Carry out pressure testing 4. Clean/maintain the work area	24
Total Hour			278

COMPETENCY STANDARD: PLUMBING

A. The Generic (Basic) Competencies

Unit of Competency: **PERFORM COMPUTATIONS USING BASIC MATHEMATICAL CONCEPTS**	Nominal Duration: 14 hrs.	Unit Code: SEIP-CON-PLU-1-G
Unit Descriptor: This unit of competency requires the knowledge, skills and attitude to perform computations using basic mathematical concepts in the workplace. It specifically includes the tasks of identifying calculation requirements in the workplace, selecting appropriate mathematical method/concept for the calculation and using appropriate instruments tools to carry out calculation.		

Elements and Performance Criteria:
(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Identify calculation requirements in the workplace	1.1 **Calculation requirements** are identified from **workplace information.**
2. Select appropriate mathematical methods/concepts for the calculation.	2.1 **Appropriate method** is selected to carry out the calculation requirements.
3. Use tool/instrument to perform calculations	3.1 Calculations are completed using appropriate **tools and instruments.**

Range of variables:

Variable	Range May include but not limited to:
1. Calculation requirements.	1.1 Area 1.2 Height 1.3 Length/Breadth/thickness 1.4 Diameter 1.5 Weight 1.6 Capacity 1.7 Time 1.8 Temperature. 1.9 Material usage 1.10 Costing
2. Workplace information	2.1 Construction Plan 2.2 Design and Drawing of Plumbing 2.3 Working drawing 2.4 Verbal instructions 2.5 Job order
3. Appropriate method	3.1 Addition

	3.2 Subtraction
	3.3 Division
	3.4 Multiplication
	3.5 Conversion
	3.6 Percentage and ratio calculation
	3.7 Simple equation
4. Tools/instruments	4.1 Calculator

Curricular Content Guide

1. Underpinning Knowledge	1.1 Numerical concept
	1.2 Basic mathematical methods such as addition, subtraction, multiplication and division and percentage.
	1.3 Mathematical language, symbols and terminology.
	1.4 Measuring units
2. Underpinning Skills	2.1 Adding numbers
	2.2 Subtracting numbers
	2.3 Multiplying numbers.
	2.4 Dividing numbers.
	2.5 Measuring of linear
	2.6 Using of mathematical language, symbols, terminology and technology.
	2.7 Measuring of different physical parameter.
	2.8 Calculating geometrical parameters: angle, parallelism, perpendicularity, area and volume
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices
	3.2 Promptness in carrying out activities
	3.3 Tidiness and timeliness
	3.4 Respect to peers, sub-ordinates and seniors in workplace
	3.5 Environmental concern
	3.6 Sincerity and honesty
4. Resource Implications	The following resources must be provided.
	4.1 Stationeries
	4.2 Consumables
	4.3 Calculators
	4.4 Computers
	4.5 Measuring tape

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Identified calculation requirements from workplace information. 1.2 Selected appropriate method to carry out the calculation requirements. 1.3 Completed calculations using appropriate tools/instruments.
2. Methods of Assessment	Methods of assessment may include but not limited to: 2.1 Written test 2.2 Oral questioning 2.3 Demonstration.
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: APPLY OCCUPATIONAL HEALTH AND SAFETY (OHS) PRACTICES IN THE WORKPLACE	Nominal Duration: 10 hrs.	Unit Code: SEIP-CON-PLU-2-G
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to apply occupational health and safety (OHS) practices in the workplace. It specifically includes the tasks of identifying OHS policies and procedures, applying personal health and safety practices, reporting hazards and risks and responding to emergencies.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Identify OHS policies and procedures	1.1 **OHS policies** and safe operating procedures are read and understood. 1.2 Safety signs and symbols are identified and followed. 1.3 Emergency response, evacuation procedures and other contingency measures are determined.
2. Apply personal health and safety practices	2.1 OHS policies and procedures are followed and practiced. 2.2 **Personal Protective Equipment (PPE)** is selected and used. 2.3 Personal hygiene is maintained.
3. Report hazards and risks	3.1 **Hazards and risks** are identified, assessed and controlled. 3.2 Incidents arising from hazards and risks are reported to authority. 3.3 Corrective actions are implemented to correct unsafe conditions in the workplace.
4. Respond to emergencies	4.1 Alarms and warning devices are responded. 4.2 **Emergency response plans and procedures** are implemented. 4.3 **First aid procedure** is applied during emergency situations.

Range of Variables

Variable	Range
	May include but not limited to:
1. OHS policies	1.1 International OHS requirements 1.2 Bangladesh standards for OHS 1.3 Building Code 1.4 Fire Safety Rules and Regulations 1.5 Industry Guidelines
2. Personal Protective Equipment (PPE)	2.1 Apron 2.2 Gas Mask 2.3 Gloves 2.4 Safety shoes 2.5 Helmet 2.6 Face mask 2.7 Overalls

	2.8 Goggles and safety glasses
	2.9 Ear plugs
	2.10 Sun block
	2.11 Chemical/Gas masks
3. Hazards and risks	3.1 Chemical hazards.
	3.2 Biological hazards.
	3.3 Physical Hazards.
	3.3.1 Machine hazards.
	3.3.2 Materials hazards.
	3.3.3 Tools and Equipment hazards.
4. Emergency response plans and procedures	4.1 Firefighting procedures
	4.2 Earthquake response procedures
	4.3 Evacuation procedures
	4.4 Medical and first aid
5. First aid procedure	5.1 Washing of open wound
	5.2 Washing chemically infected area
	5.3 Applying bandage
	5.4 Tourniquet
	5.5 Applying CPR (Cardiopulmonary Resuscitation)
	5.6 Taking appropriate medicine

Curricular Evidence Guide:

1. Underpinning Knowledge	1.1 OHS workplace policies and procedures.
	1.2 Work safety procedures.
	1.3 Emergency procedures.
	1.3.1 Firefighting.
	1.3.2 Earthquake response.
	1.3.3 Explosion response.
	1.3.4 Accident response.
	1.4 Types of (biological, chemical and physical) and their effects.
	1.5 PPE types and uses.
	1.6 Personal hygiene practices.
	1.7 OHS awareness.
2. Underpinning Skills	2.1 Identifying OHS policies and procedures
	2.2 Following personal work safety practices
	2.3 Reporting hazards and risks
	2.4 Responding to emergency procedures
	2.5 Maintaining physical well-being in the workplace
	2.6 Performing first aids.
	2.7 Performing basic firefighting accessories using fire extinguishers
	2.8 Applying basic first aid procedures
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices
	3.2 Communication with peers, sub-ordinates and seniors in workplace
	3.3 Promptness in carrying out activities
	3.4 Tidiness and timeliness

	3.5 Respect of peers, sub-ordinates and seniors in workplace
	3.6 Environmental concern
	3.7 Sincere and honest to duties
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 PPEs
	4.3 Firefighting equipment
	4.4 Emergency response manual
	4.5 First aid kits

Assessment Evidence Guide:

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Followed OHS policies and procedures.
	1.2 Selected and used personal protective equipment (PPE).
	1.3 Reported incidents arising from hazards and risks to authority.
	1.4 Emergency response plans and procedures are implemented.
	1.5 Applied basic first aid procedure.
2. Methods of Assessment	Methods of assessment may include but not limited to:
	2.1 Written test
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Interview
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **COMMUNICATE IN ENGLISH IN THE WORKPLACE**	Nominal Duration: 14 hrs.	Unit Code: SEIP-CON-PLU-3-G
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to communicate in English in the workplace. It specifically includes work tasks of reading and understanding workplace documents in English, writing simple workplace written communications in English, listening and comprehending to English conversations and performing conversations in English.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Interpret workplace documents in English	1.1 Workplace documents are interpreted 1.2 Visual information is interpreted.
2. Write simple workplace communications in English	2.1 Simple **routine workplace documents** are prepared using key words, phrases, simple sentences and **visual aids** are prepared. 2.2 Key information is written in the appropriate places in standard forms.
3. Listen and comprehend to English conversations	3.1 Active listening is demonstrated.
4. Perform conversations in English language	4.1 Conversation is performed in English with peers, customers and management to the required workplace standard.

Range of Variables

Variable	Range
	May Include but not limited to:
1. Routine workplace documents	1.1 Agenda 1.2 Simple reports such as progress and incident reports 1.3 Job sheets 1.4 Operational manuals 1.5 Brochures and promotional material 1.6 Visual and graphic materials 1.7 Standards 1.8 OSH information 1.9 Signs
2. Visual aids	2.1 Maps 2.2 Diagrams 2.3 Forms 2.4 Labels 2.5 Graphs 2.6 Charts

Curricular Evidence Guide:

1. Underpinning Knowledge	1.1 Interpret workplace documents in English
	1.2 Write simple routine workplace documents in English
	1.3 Listen to conversation in English
	1.4 Perform conversation in English
	1.5 Interaction skills (i.e., teamwork, interpersonal skills, etc.)
	1.6 Job roles, responsibilities and compliances
2. Underpinning Skills	2.1 Ability to read and understand workplace documents in English by using appropriate vocabulary and grammar, standard spelling and punctuation
	2.2 Ability to write simple routine workplace documents in English such as: Schedules and agenda, job sheets, operational manuals and brochures and promotional material
	2.3 Ability of listening in English and interpreting
	2.4 Ability to perform conversation in English with peers, customers and management to the required workplace standard
	2.5 Work effectively with others
	2.5.1 Listening and questioning skills
	2.5.2 Ability to follow simple directions
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices
	3.2 Promptness in carrying out activities
	3.3 Tidiness and timeliness
	3.4 Respect of peers, sub-ordinates and seniors in workplace
	3.5 Environmental concern
	3.6 Sincere and honest to duties
4. Resource Implications	The following resources must be provided:
	4.1 Work place Procedure
	4.2 Materials relevant to the proposed activity
	4.3 All tools, equipment, material and documentation required.
	4.4 Relevant specifications or work instructions

Assessment Evidence Guide:

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Converse in English with peers and customers.
	1.2 Made reports of workplace documents in English.
2. Methods of Assessment	Methods of assessment may include but not limited to:
	2.1 Written test
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Interview
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **OPERATE IN A SELF-DIRECTED TEAM**	Nominal Duration: 8 hrs.	Unit Code: SEIP-CON-PLU-4-G
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to operate in a self-directed team. It specifically includes work tasks of identifying team goals and work processes, communicating and cooperating with team members, working and solving problems as a team member.		

Elements and Performance Criteria:
(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Identify team goals and work processes	1.1 Team goals and collaborative decision making processes are identified. 1.2 Roles and responsibilities of team members are identified. 1.3 Relationships within team and with other workers are identified.
2. Communicate and cooperate with team members.	2.1 Effective interpersonal skills are used to interact with team members and to contribute to activities and objectives. 2.2 Formal and informal **forms of communication** are used effectively to support team achievement. 2.3 Diversity in character is respected and valued in team functioning. 2.4 Views and opinions of other team members are understood and valued. 2.5 Workplace terminology is used correctly to assist communication.
3. Work as a team member.	3.1 Duties, responsibilities, authorities, objectives and task requirements are identified and clarified with team. 3.2 Tasks are performed in accordance with organizational and team requirements, specifications and workplace procedures. 3.3 Team member's support with other members are made to ensure team achieves goals, awareness and requirements. 3.4 Agreed reporting lines are followed using standard operating procedure.
4. Solve problems as a team member	4.1 Current and potential problems faced by team are identified. 4.2 A solution to the problem is identified. 4.3 Problems are solved effectively and the outcome of the implemented solution is evaluated.

Range of Variables

Variable	Range
	May Include but not limited to:
1. Forms of communication	1.1 Agenda 1.2 Simple reports such as progress and incident reports 1.3 Job sheets 1.4 Operational manuals

	1.5 Brochures and promotional material
	1.6 Visual and graphic materials
	1.7 Standards
	1.8 OSH information
	1.9 Signs

Curricular Evidence Guide:

1. Underpinning Knowledge	1.1 Team goals and collaborative decision making processes
	1.2 Roles and responsibilities of team members
	1.3 Relationships within team and with other workers
	1.4 Effective interpersonal skills to interact with team members
	1.5 Effective formal and informal forms of communication
	1.6 Value of diversity in team functioning.
	1.7 Correct use of workplace terminology
	1.8 Team's duties, responsibilities, authorities, objectives and task requirements
	1.9 Support mechanism to other members of team to ensure achievements of goals.
	1.10 Methods of identifying current and potential problems faced by a team
	1.11 Effective problem solving methods and evaluation of outcomes
2. Underpinning Skills	2.1 Identifying team goals and collaborative decision making processes
	2.2 Identifying roles and responsibilities of team members
	2.3 Identifying relationships within team and with other workers
	2.4 Using effective interpersonal skills to interact with team members and to contribute to activities and objectives
	2.5 Using formal and informal forms of communication
	2.6 Understanding and valuing views and opinions of other team members
	2.7 Performing tasks in accordance with organizational and team requirements, specifications and workplace procedures.
	2.8 Supporting other members of the team to ensure team achieves goals, awareness and requirements.
	2.9 Identifying current and potential problems faced by the team
	2.10 Identifying solutions to the problem
	2.11 Solving problems effectively and evaluating the outcome of the implemented solution
3. Underpinning Attitudes	3.1 Teamwork
	3.2 Promptness in carrying out activities.
	3.3 Tidiness and timeliness.
	3.4 Respect of peers, sub-ordinates and seniors in workplace.
	3.5 Sincere and honest to duties
4. Resource Implications	The following resources must be provided:
	4.1 Workplace (simulated or actual)
	4.2 Pens

	4.3 Papers
	4.4 Work books
	4.5 Learning manuals

Assessment Evidence Guide:

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Identified team goals and work processes 1.2 Communicated and cooperated with team members. 1.3 Worked as a team member 1.4 Solved problems as a team member
2. Methods of Assessment	Methods of assessment may include but not limited to: 2.1 Written test 2.2 Demonstration 2.3 Oral questioning
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

B. **The Sector Specific (Common) Competencies**

Unit of Competency: **TRANSLATE DRAWINGS, PLANS AND SPECIFICATIONS**	Nominal Duration: 10 hrs.	Unit Code: SEIP-CON-PLU-1-S
Unit Descriptor: This unit covers the knowledge, skills and attitudes required for a worker to translate drawings, plans and specifications. It specifically includes the tasks of accessing information from manuals, designs and plans, interpreting drawings and specifications from manuals, designs and plans and storing manuals, designs and plans.		

Elements and Performance Criteria:
(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Access information from manuals, designs and plans	1.1 Appropriate **manuals** are identified and accessed. 1.2 Version and date of the manual are checked to ensure up-to-date specifications of tools, equipment, materials and procedures.
2. Interpret drawings and specifications from manuals, designs and plans	2.1 Relevant **drawings** and **specifications** are correctly recognized from manuals, designs and plans. 2.2 Terms and abbreviations are recognized. 2.3 **Signs and symbols** are interpreted.
3. Store manuals, designs and plans	3.1 Manuals, designs and plans are collected and packed. 3.2 Manuals, designs and plans are stored to prevent damage, and ready access and updating of information when required.

Range of Variables

Variable	Range
	May include but not limited to:
1. Manuals	1.1 Manufacturer's Specification Manual 1.2 Repair Manual 1.3 Maintenance Procedure Manual 1.4 Periodic Maintenance Manual 1.5 Quality Manual 1.6 Instruction Manual
2. Drawings	2.1 Technical drawings 2.2 Sketches
3. Specifications	3.1 Product specifications 3.2 Performance specifications 3.3 Method specifications
4. Signs and symbols	4.1 Refers to all signs and symbols associated in the construction sector

Curricular Content Guide

1. Underpinning Knowledge	1.1 Types of Construction Manuals 1.2 Identification of Signs and Symbols 1.3 Identification of Units of Measurement 1.4 Identification of Units of Conversion 1.5 Drawings and Specifications 1.6 Terms and Abbreviations Used
2. Underpinning Skills	2.1 Checking version and date of the manual to ensure up-to-date specifications of tools, equipment, materials and procedures 2.2 Identifying relevant drawings and specifications correctly 2.3 Identifying terms and abbreviations 2.4 Identifying signs and symbols 2.5 Interpreting drawings and specifications 2.6 Interpreting schedules, dimensions and specifications contained in the drawings 2.7 Storing manuals
3. Underpinning Attitudes	3.1 Eagerness to learn 3.2 Orderliness 3.3 Resourcefulness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Different types of construction manuals and literatures 4.3 Pens 4.4 Papers 4.5 Work books

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Checked version and date of the manual to ensure up-to-date specifications of tools, equipment, materials and procedures. 1.2 Identified relevant drawings and specifications correctly. 1.3 Identified terms and abbreviations. 1.4 identified Signs and symbols. 1.5 Interpreted drawings and specifications. 1.6 Interpreted schedules, dimensions and specifications contained in the drawings.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **WORK WITH HAND TOOLS AND POWER TOOLS**	Nominal Duration: 10 hrs.	Unit Code: SEIP-CON-PLU-2-S
Unit Descriptor: This unit covers the knowledge, skills and attitudes required for a worker to work with hand tools and power tools properly and safely. It specifically includes the tasks of inspecting hand tools and power tools for usability, using hand tools properly and safely, operating power tools properly and safely and cleaning/maintaining hand tools and power tools after use.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Inspect hand tools and power tools for usability	1.1 Appropriate tools are selected. 1.2 Application of tools to job requirement is determined. 1.3 Usability of tools are checked and verified. 1.4 **Hand tools** and **power tools** are prepared. 1.5 Sources of power supply for power tools identified.
2. Use hand tools properly and safely	2.1 Appropriate hand tool for the job is used. 2.2 Proper and safe use/operation is applied in the different types of hand tools. 2.3 **Safety precautions** is observed when using hand tools. 2.4 Unsafe or faulty tools are identified and marked for repairing
3. Operate power tools properly and safely	3.1 Power supply outlet and electrical cord are inspected and confirmed safe for use in accordance with established workplace safety requirements. 3.2 Proper sequence of operation is applied in using power tools to produce results. 3.3 Power tools are used safely in accordance to manufacturer's operating specification.
4. Clean/maintain hand tools and power tools after use	4.1 Dust and foreign matters are removed from power tools in accordance to workplace standard. 4.2 Condition of tools is checked after use. 4.3 Appropriate lubricant is applied after use and prior to storage. 4.4 **Measuring tools** are checked and calibrated. 4.5 Defective tools, instruments, power tools and accessories are inspected and corrected or replaced.

Range of Variables

Variable	Range
	May include but not limited to:
1. Hand tools	1.1 Adjustable spanners 1.18 Pliers 1.2 Auger bits 1.19 Plumb bob 1.3 Bars (crow and pitch) 1.20 Punches 1.4 Bench vise 1.21 Rip saw 1.5 Bolt cutters 1.22 Scrapers 1.6 C-clamp 1.23 Screwdrivers 1.7 Chisels 1.24 Sealant Gun 1.8 Crosscut saws 1.25 Shovel/Spades

	1.9 Die and stock (threader) 1.26 Sledge Hammers 1.10 Drill bits 1.27 Sockets 1.11 Files of all cross-sectional 1.28 Spanners and Wrenches shapes and types 1.29 Spatula/Putty Knives 1.12 Hacksaw 1.30 String Lines 1.13 Hammer 1.31 Taps 1.14 Hand drill 1.32 Trowels and Floats 1.15 Hand saw 1.33 Vice grip 1.16 Measuring Tapes 1.34 Wire Cutters 1.17 Nips 1.35 Picks/Mattocks 1.36 Paint Brush
2. Power tools	2.1 Power drills 2.2 Nail guns 2.3 Angle grinders 2.4 Pneumatic wrenches 2.5 Grinders 2.6 Nibblers 2.7 Jack hammer 2.8 Threading machine 2.9 Pedestal drills 2.10 Grinders
3. Safety precautions	3.1 Use of appropriate PPEs 3.2 Proper hand, feet and eye coordination 3.3 Safe condition of electrical outlets, cords and lamps 3.4 Working environment 3.5 Safe operating condition of hand tools and power tools 3.6 Awareness to OHS requirements
4. Measuring instruments	4.1 Measuring tape 4.2 Hose level 4.3 Water level 4.4 Caliper 4.5 Steel rule 4.6 Protractor 4.7 Tri-square

Curricular Content Guide

1. Underpinning Knowledge	1.1 Types of tools, functions and use 1.2 Types of Hand tools and their proper use and techniques 1.3 Types of Power tools, use and safe handling method 1.4 Technical application of tools 1.5 Procedures in the use of hand tools and power tools 1.6 Policies and procedures for occupational health and safety 1.7 Use of PPE 1.8 Handling of tools and equipment 1.9 Reporting and documentation 1.10 Preventive maintenance 1.11 Methods and techniques

	1.12 Quality procedures 1.13 Storage procedures
2. Underpinning Skills	2.1 Using appropriate hand tool for the job 2.2 Observing safety precautions when using hand tools 2.3 Using power tools correctly and safely in accordance to manufacturer's operating specification. 2.4 Checking condition of tools after use 2.5 Applying appropriate lubricant on hand tools and power tools after use and prior to storage 2.6 Inspecting and correcting or replacing defective tools, instruments, power tools and accessories 2.7 Storing Tools and power tools safely in appropriate location
3. Underpinning Attitudes	3.1 Commitment to occupational health and safety practices 3.2 Environmental concerns 3.3 Eagerness to learn 3.4 Tidiness and timeliness 3.5 Concern to proper use of tools 3.6 Orderliness
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Different types of construction hand tools and power tools 4.3 Pens 4.4 Papers 4.5 Work books 4.6 Operation and maintenance manuals

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Used appropriate hand tool for the job. 1.2 Observe safety precautions when using hand tools. 1.3 Used power tools safely in accordance to manufacturer's operating specification. 1.4 Cleaned and maintained hand tools and power tools after use and prior to storage. 1.5 Inspected and corrected or replaced defective tools, instruments, power tools and accessories. 1.6 Stored tools and power tools safely in appropriate location.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **CARRY OUT MEASUREMENTS AND CALCULATIONS**	Nominal Duration: 16 hrs.	Unit Code: SEIP-CON-PLU-3-S
Unit Descriptor: This unit covers the knowledge, skills and attitudes required for a worker to carry-out measurements and calculations. It specifically includes the tasks of checking usability of measuring devices, carrying out accurate construction work measurements, executing simple construction work calculations and cleaning and maintaining measuring instruments.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Check usability of measuring devices	1.1 Appropriate **measuring device** is selected for the job. 1.2 Applications of measuring device is determined. 1.3 Usability of measuring device is checked and verified. 1.4 Measuring device is prepared.
2. Carry out accurate construction work measurements	2.1 Measurements are obtained using appropriate measuring device. 2.2 **Systems of measurements** are identified and converted where necessary. 2.3 Results are confirmed and recorded.
3. Execute simple construction work calculations	3.1 Simple calculations involving **four basic mathematical operations** are executed. 3.2 Other operations are used to complete tasks in construction works 3.3 Appropriate formulas for calculating quantities of materials are selected. 3.4 Calculations are performed and verified. 3.5 Material quantities are calculated. 3.6 Results are interpreted and communicated to authority.
4. Clean and maintain measuring instruments	4.1 Dust and foreign matters are removed from measuring instrument 4.2 Condition of instrument is checked 4.3 Appropriate lubricant is applied after use and prior to storage 4.4 Measuring instruments are checked and calibrated. 4.5 Instrument is stored in accordance to workplace procedure

Range of Variables

Variable	Range
	May include but not limited to:
1. Measuring device	1.1 Slide calipers 1.2 Steel tape measure 1.3 Steel rule 1.4 Square 1.5 Tri-square

	1.6 Feeler gauges
	1.7 Water level
	1.8 Hose level
	1.9 Thermometers
	1.10 Protractor
2. Systems of measurements	2.1 ISO standard
	2.2 English system
	2.3 Metric system
3. Four basic mathematical operations	3.1 Addition
	3.2 Subtraction
	3.3 Multiplication
	3.4 Division

Curricular Content Guide

1. Underpinning Knowledge	1.1 Types and principles of operation of measuring devices
	1.2 The ISO standard of measurements
	1.3 Methods of measurement and calculation
	1.4 Fraction and decimals
	1.5 Linear measurement
	1.6 Units of conversion and conversion factors in measurements
	1.7 Dimensioning and fits and tolerances
	1.8 Calculating ratio and proportion
	1.9 Care in the use of measuring devices
2. Underpinning Skills	2.1 Selecting appropriate measuring device for the job
	2.2 Checking and verifying usability of measuring device
	2.3 Obtaining measurements using appropriate measuring device.
	2.4 Confirming measurements and recording results
	2.5 Carrying out simple calculations involving four basic mathematical operations
	2.6 Calculating material quantities
	2.7 Interpreting and communicating results to authority
	2.8 Cleaning and storing measuring instruments
3. Underpinning Attitudes	3.1 Cleanliness/tidiness
	3.2 Commitment to occupational health and safety practices
	3.3 Environmental concerns
	3.4 Eagerness to learn
	3.5 Timeliness and orderliness
	3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 Different types of measuring and checking tools/instruments
	4.3 Pens
	4.4 Papers
	4.5 Work books
	4.6 Measuring tools' operating and maintenance manual

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Selected appropriate measuring device for the job.
	1.2 Checked and verified usability of measuring device.
	1.3 Obtained measurements using appropriate measuring device.
	1.4 Confirmed measurements and recorded results.
	1.5 Carried out Simple calculations involving four basic mathematical operations.
	1.6 Calculated material quantities.
	1.7 Interpreted and communicated Results to authority.
2. Methods of Assessment	Competency should be assessed by:
	2.1 Written examination
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Workplace observation
	2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

C. Occupation Specific (Core) Competencies

Unit of Competency: PERFORM PIPE THREADING OPERATION	Nominal Duration: 40 hrs.	Unit Code: SEIP-CON-PLU-1-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to perform pipe threading operation when performing plumbing works in the construction sector. It specifically includes the tasks of gathering and checking tools, equipment and materials, carrying out steel pipe cutting operation, carrying out thread cutting operation, assembling pipe run, cleaning/maintaining the work area.		

Elements and Performance Criteria:
(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Gather and check tools, equipment and materials	1.1 Required pipe size and dimensions are identified in accordance to plumbing plan/design. 1.2 Pipes are selected and gathered in accordance to specification. 1.3 **PPEs** are checked and used appropriately. 1.4 **Tools and equipment and materials** are selected, gathered and checked for usability.
2. Carry out steel pipe cutting operation	2.1 **Pipes** are measured and marked in accordance to plumbing plan/drawing specification. 2.2 Steel pipe is clamped using appropriate clamping device. 2.3 Pipe run length is measured and cut using appropriate cutting tool. 2.4 Pipe length is measured and cut in accordance with plumbing plan/drawing and the type of attachment **fittings.** 2.5 Pipe run length is measured within the specified tolerance.
3. Carry out thread cutting operation	3.1 Steel pipes are clamped and fixed using pipe vice. 3.2 Newly cut pipe is de burred/removed of burr using appropriate **de burring tool.** 3.3 Diestocks are adjusted and initiated into the pipe end squarely. 3.4 Thread cutting is carried out on pipes in accordance to workplace procedure. 3.5 **Coolant** is used during thread cutting operation. 3.6 Threads are checked to conform with the specified form and measurement in accordance with plan/drawing.
4. Assemble pipe run	4.1 Pipes are laid down in accordance with the planned/designed pipe run. 4.2 Pipes and pipe fittings are assembled and fixed in accordance with planned/designed pipe run. 4.3 Pipes, fittings and pipe runs are checked for damage/quality of work. 4.4 Assembled pipe runs are measured/checked within tolerable dimensions/length in accordance with design/specification.
5. Clean/maintain the work area	5.1 Plumbing tools/equipment are cleaned and checked for operability.

	5.2 Work area is cleaned and waste materials are disposed in accordance with workplace requirements.

Range of Variables

Variable	Range	
	May include but not limited to:	
1. PPE	1.1 Safety helmet 1.2 Safety shoes 1.3 Hand gloves 1.4 Safety glass 1.5 Apron 1.6 Appropriate clothing	

2. Tools, equipment and materials	2.1 Tools:
	   2.1.1 Measuring tape (5 mtrs.)
	   2.1.2 Steel rule
	   2.1.3 Caliper
	   2.1.4 Adjustable wrench
	   2.1.5 Box wrench set
	   2.1.6 Pipe wrench
	   2.1.7 Pliers, mechanical
	   2.1.8 Die stock
	   2.1.9 Pipe cutter
	   2.1.10 Hand hacksaw
	   2.1.11 Screw driver: Star, flat, positive
	   2.1.12 Spirit level
	   2.1.13 Pipe reamer
	   2.1.14 Files: flat, half round, round
		2.2 Equipment
		   2.2.1 Pipe threading machine
		   2.2.2 Power hacksaw
		   2.2.3 Drill press
		   2.2.4 Grinder, angle
		   2.2.5 Welding machine
		2.3 Materials
		   2.3.1 Coolant, water based
		   2.3.2 Soft stone (Marker)
		   2.3.3 Marking pen
		   2.3.4 Pencil
		   2.3.5 Solvent
		   2.3.6 Thread tape (Teflon)
		   2.3.7 Welding rods
		   2.3.8 Masking tape

3. Pipes	3.1 G.I. pipe 3.2 PVC pipe 3.3 Stainless steel pipe 3.4 B.I. pipe 3.5 Cast iron pipe	
4. Fittings	4.1 Elbow, 90° 4.2 Elbow. 45° 4.3 Tee 4.4 Coupling 4.5 Pipe nipple 4.6 Pipe plug	
5. De burring tool	5.1 Flat file 5.2 Round file 5.3 Half round file 5.4 Pipe reamer 5.5 Sand paper	
6. Coolant	6.1 Water	

	6.2	Oil
	6.3	Air
	6.4	Synthetic
	6.5	Nitrogen

CURRICULAR CONTENT GUIDE

1. Underpinning Knowledge	1.1	Interpreting plumbing drawing
	1.2	Types of measuring and checking tools
	1.3	Measuring and marking techniques on pipes
	1.4	Methods of clamping and fixing steel pipes using pipe vice
	1.5	Types of pipe cutting tool
	1.6	Procedure of cutting pipes using appropriate cutting tool
	1.7	De burring tools and their application
	1.8	Types of pipe threads
	1.9	Purpose of cutting coolants
	1.10	Types and function of thread cutting machines
	1.11	Procedure of cutting threads on pipes
	1.12	Types of pipe fittings and their application
	1.13	Methods and techniques of fixing pipes and pipe fittings
	1.14	Pipe run calculation method
2. Underpinning Skills	2.1	Measuring and marking pipes
	2.2	Clamping and fixing steel pipes using pipe vice
	2.3	Cutting pipes using appropriate cutting tool
	2.4	De burring newly cut pipe from burr/sharp edges using appropriate de burring tool
	2.5	Cutting threads on pipes in accordance with workplace procedure
	2.6	Fixing pipes and pipe fittings in accordance with planned/designed pipe run.
	2.7	Measuring/checking assembled pipe runs within tolerable dimensions/length in accordance with design/specification]
	2.8	Cleaning workplace and disposing waste materials in accordance with workplace requirement
3. Underpinning Attitudes	3.1	Patience
	3.2	Commitment to occupational health and safety practices
	3.3	Environmental concerns
	3.4	Eagerness to learn
	3.5	Tidiness and timeliness
	3.6	Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1	Workplace (simulated or actual)
	4.2	Required plumbing tools for the job
	4.3	Pipes and fittings
	4.4	Materials necessary to carry out the job
	4.5	Work instruction sheet
	4.6	Pens
	4.7	Paper

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Measured and marked pipes in accordance to plumbing plan/drawing specification.
	1.2 Clamped and fixed Steel pipes using pipe vice.
	1.3 Cut pipes using appropriate cutting tool.
	1.4 De burred newly cut pipe from burr/sharp edges using appropriate de burring tool.
	1.5 Cut threads on pipes in accordance with workplace procedure.
	1.6 Fixed pipes and pipe fittings in accordance with planned/designed pipe run.
	1.7 Measured/checked assembled pipe runs within tolerable dimensions/length in accordance with design/specification.
	1.8 Cleaned workplace and disposed waste materials in accordance with workplace requirement.
2. Methods of Assessment	Competency should be assessed by:
	2.1 Written examination
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Workplace observation
	2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **PERFORM ACCESS CUTTING AND** **ENCROACHMENT WORKS**	Nominal Duration: 32 hrs.	Unit Code: SEIP-CON-PLU-2-O

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to perform access cutting and encroachment works. It specifically includes the tasks of interpreting drawings and plumbing plans, inspecting encroachment work area, gathering tools, equipment and materials, cutting and making access through walls and floors and cleaning the work area.

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Interpret drawings and plumbing plans	1.1 Building drawing/plumbing plan is gathered. 1.2 Building drawing/plumbing plans are interpreted. 1.3 Work area/**line of encroachment** is identified.
2. Inspect encroachment work area	2.1 Possible **obstructions/limitations** along the line of encroachment work are identified. 2.2 Possible solutions/remedies needed for identified obstructions/limitations are planned out. 2.3 Obstructions/limitations are reported with immediate superior whenever necessary. 2.4 **Tools, equipment and materials** required to carry out encroachment work are identified.
3. Gather tools, equipment and materials	3.1 Tools, equipment and materials are selected, gathered and checked for usability. 3.2 **PPE**s are checked and used appropriately.
4. Cut and make access through walls and floors	4.1 Lay out for access/encroachment work is made. 4.2 Concrete wall and floor is cut to create pipe access/encroachment in accordance to plumbing plan/specification. 4.3 Cutting walls and floors are made without causing damage to the wall or floor and adjacent installations. 4.4 Correct usage of tools and equipment is observed.
5. Clean/maintain the work area	5.1 Used tools and equipment are cleaned and maintained. 5.2 Work area is cleaned. 5.3 Excess and waste materials are disposed in accordance to workplace requirement.

Range of Variables

Variable	Range
	May include but not limited to:
1. Line of encroachment	1.1 Floors 1.2 Walls 1.3 Ceilings 1.4 Slabs 1.5 Breams 1.6 Columns

2. Obstructions/limitations	2.1 Built in appliances 2.2 Cabinets 2.3 Concrete column 2.4 Concrete beam 2.5 Existing pipe runs 2.6 Door 2.7 Window	

3. Tools, equipment and materials	3.1 Tools;
	    3.1.1 Measuring tape (10 mtrs.)
	    3.1.2 Steel rule
	    3.1.3 Cold chisel
	    3.1.4 Hammer, claw
	    3.1.5 Mallet
	    3.1.6 Cold chisel
	    3.1.7 Adjustable wrench
	    3.1.8 Box wrench set
	    3.1.9 Pipe wrench
	    3.1.10 Pliers, mechanical
	    3.1.11 Hand hacksaw
	    3.1.12 Spirit level
	    3.1.13 Hand hack saw
		3.2 **E**quipment
		    3.2.1 Jackhammer
		    3.2.2 Drill press
		    3.2.3 Grinder, angle
		    3.2.4 Portable drill
		    3.2.5 Oxy-acetylene cutting outfit
		    3.2.6 Welding machine
		3.3 Materials
		    3.3.1 Soft stone (Marker)
		    3.3.2 Marking pen
		    3.3.3 Pencil
		    3.3.4 Welding rods
		    3.3.5 Cement
		    3.3.6 Sand
		    3.3.7 Putty
		    3.3.8 Rubber cement

4. PPE	4.1 Safety helmet 4.2 Safety shoes 4.3 Hand gloves 4.4 Safety glass 4.5 Apron 4.6 Appropriate clothing	

Curricular Content Guide

1. Underpinning Knowledge	1.1 Methods and procedure of cutting concrete wall and floor to create pipe access 1.2 Interpreting techniques for building drawing/plumbing plans 1.3 Common types of obstructions/limitations for encroachment work in plumbing 1.4 Workplace policies on tools borrowing, checking and maintenance 1.5 Proper use of PPEs 1.6 Methods of laying-out for access/encroachment work 1.7 Procedure for Cutting of walls and floors without causing damage to the wall or floor and adjacent installations. 1.8 Workplace procedure in Cleaning used tools & equipment and excess and waste materials disposal
2. Underpinning Skills	2.1 Interpreting building drawing/plumbing plans 2.2 Planning-out possible solutions/remedies needed for identified obstructions/limitations for encroachment work

	2.3 Selecting, gathering and checking tools, equipment, PPEs and materials for usability
	2.4 Laying-out for access/encroachment work
	2.5 Cutting walls and floors without causing damage to the wall or floor and adjacent installations
	2.6 Cleaning used tools & equipment and disposed excess and waste materials are in accordance to workplace requirement
3. Underpinning Attitudes	3.1 Patience
	3.2 Commitment to occupational health and safety practices
	3.3 Environmental concerns
	3.4 Eagerness to learn
	3.5 Tidiness and timeliness
	3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 Tools and equipment required of the job
	4.3 Materials necessary to carry out the job
	4.4 Work instruction sheet
	4.5 Pens
	4.6 Paper

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Interpreted building drawing/plumbing plans.
	1.2 Planned out possible solutions/remedies needed for identified obstructions/limitations for encroachment work.
	1.3 Selected, gathered and checked tools, equipment, PPEs and materials for usability.
	1.4 Laid-out for access/encroachment work.
	1.5 Cut walls and floors without causing damage to the wall or floor and adjacent installations.
	1.6 Cleaned used tools and equipment and disposed excess and waste materials in accordance to workplace requirement.
2. Methods of Assessment	Competency should be assessed by:
	2.1 Written examination
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Workplace observation
	2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: CARRY OUT WATER SUPPLY LINE INSTALLATION USING G.I., PPR AND HDPE PIPES	Nominal Duration: 50 hrs.	Unit Code: SEIP-CON-PLU-3-O

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to carry out water supply line installation using Pipes. It specifically includes the tasks of gathering and inspecting tools, equipment and materials, performing G.I. Pipe cutting operation, performing Pipe threading operation, assembling Pipe runs, cleaning/maintaining the work area.

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Gather and inspect tools, equipment and materials	1.1 **PPE** are selected and used. 1.2 **Tools, equipment and materials** are gathered and checked for usability. 1.3 Pipes are identified and gathered in accordance with plumbing plan specifications.
2. Perform pipe cutting operation	2.1 G.I/PPR/HDPE pipes are measured and marked as per plan/drawing specification. 2.2 G.I/PPR/HDPE pipes are clamped using appropriate **clamping device.** 2.3 G.I/PPR/HDPE pipes are cut using appropriate cutting tool. 2.4 G.I/PPR/HDPE pipes are cut within the specified dimension and considering specified tolerance.
3. Perform Pipe threading operation	3.1 G.I /PPR/HDPE pipes are clamped and fixed using appropriate clamping device. 3.2 Diestocks are adjusted and initiated into the pipe end squarely. 3.3 Thread cutting is carried out on pipes in accordance to workplace procedure. 3.4 **Coolant** is used during thread cutting operation. 3.5 Threads are checked to conform with the specified form and measurement in accordance with plan/drawing.
4. Assemble pipe runs	4.1 G.I/PPR/HDPE Pipe runs are positioned on the corresponding areas as per plumbing plan. 4.2 Piping joints and fittings are tightened using appropriate tools and **sealant.** 4.3 **Pipe clamps and fixtures** along pipe runs are installed in accordance with plumbing plan. 4.4 Leaks and **non-conformance** to plumbing design/plans are checked and corrected. 4.5 Holes and openings are filled with cement plasters and **finishing.**
5. Clean/maintain the work area	5.1 Used tools and equipment are cleaned and maintained. 5.2 Workplace is cleaned. 5.3 Waste materials are disposed in accordance to workplace requirement.

Range of Variables

Variable	Range
	May include but not limited to:
1. PPE	1.1 Safety helmet 1.2 Safety shoes 1.3 Hand gloves 1.4 Safety glass 1.5 Safety Belt 1.6 Apron 1.7 Appropriate clothing

2. Tools, equipment & materials	2.1 Tools;
	    2.1.1 Measuring tape (5 mtrs.)
	    2.1.2 Steel rule
	    2.1.3 Vernier caliper
	    2.1.4 Adjustable wrench
	    2.1.5 Box wrench set
	    2.1.6 Pipe wrench
	    2.1.7 Pliers, mechanical
	    2.1.8 Die stock
	    2.1.9 Tube cutter
	    2.1.10 Hand hacksaw
	    2.1.11 Screw driver: Star, flat, positive
	    2.1.12 Files
	    2.1.13 Spirit level
	    2.1.14 Pipe reamer
	
	2.2 Equipment
	    2.2.1 Pipe threading machine
	    2.2.2 Power hacksaw
	    2.2.3 Drill press
	    2.2.4 Grinder, angle
	    2.2.5 Welding machine
	2.3 Materials
	    2.3.1 Coolant, water based
	    2.3.2 Soft stone (Marker)
	    2.3.3 Marking pen
	    2.3.4 Pencil
	    2.3.5 Plastic based sealant
	    2.3.6 Rubber based sealant
	    2.3.7 Synthetic sealant
	    2.3.8 Thread tape (Teflon)
	    2.3.9 Welding rods
	    2.3.10 Pipes
	    2.3.11 Types of fittings like Gate valve, Check Valve, Globe Valve, Foot Valve etc

3. Clamping device	3.1 Pipe stand 3.2 Bench vise w/v-blocks 3.3 Vise grip 3.4 Pipe chuck 3.5 Threading machine chucks
4. Coolant	4.1 Water 4.2 Oil 4.3 Air 4.4 Synthetic 4.5 Nitrogen
5. Sealants	5.1 Thread tape (Teflon) 5.2 Cement 5.3 Plastic-based seals 5.4 Rubber-based seals 5.5 Synthetic seals

	5.6 Silicone seals
6. Pipe clamps and fixtures	6.1 Steel pipe hangers
	6.2 Plastic pipe hangers
	6.3 Pipe clamps (plastic, steel, rubber)
	6.4 Tapes
7. Non-conformance	7.1 Leak
	7.2 Length (Dimension)
	7.3 Pipe size
	7.4 Pipe offset angles
	7.5 Obstacles
	7.6 Aesthetics/appearance
8. Finishing	8.1 Caulk
	8.2 Cement
	8.3 Paint
	8.4 Tiles/marble
	8.5 Grommet

Curricular Content Guide

1. Underpinning Knowledge	1.1 Types of pipe threads and their nomenclature
	1.2 Techniques of measuring and marking pipes
	1.3 Procedure and technique of cutting G.I. Pipes
	1.4 G.I. pipe thread cutting procedure and proper use of thread cutting tools
	1.5 Method of positioning and lay outing steel pipe runs
	1.6 Techniques and safety precautions of tightening steel piping joints and fittings using sealants
	1.7 Thread sealing techniques
	1.8 Types, methods and techniques of filling holes and openings after plumbing works
	1.9 Types of pipe clamps and fixtures and means of Installation
	1.10 Procedure in checking and correcting leaks
	1.11 Methods of Filling oversized holes and openings with cement plasters and other finishing materials
2. Underpinning Skills	2.1 Identifying and gathering pipes in accordance with specified sizes/schedules
	2.2 Cutting G.I. Pipes using appropriate cutting tool and within the specified dimension considering specified tolerance
	2.3 Carrying out thread cutting on pipes in accordance to workplace procedure
	2.4 Positioning G.I. Pipe runs at the corresponding areas as per plumbing plan
	2.5 Tightening piping joints and fittings using appropriate tools and sealant
	2.6 Installed clamps and fixtures along pipe runs in accordance with plumbing plan
	2.7 Checking and correcting leaks and non-conformance to plumbing design/plans are
	2.8 Filling oversized holes and openings with cement plasters and

	finishing materials
	2.9 Cleaning used tools & equipment and disposing excess and waste materials in accordance to workplace requirement
3. Underpinning Attitudes	3.1 Patience
	3.2 Commitment to occupational health and safety practices
	3.3 Environmental concerns
	3.4 Eagerness to learn
	3.5 Tidiness and timeliness
	3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 Required plumbing tools for the job
	4.3 Pipes and fittings
	4.4 Materials necessary to carry out the job
	4.5 Work instruction sheet
	4.6 Pens
	4.7 Paper

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Identified and gathered pipes in accordance with specified sizes/schedules.
	1.2 Cut G.I. Pipes using appropriate cutting tool and within the specified dimension considering specified tolerance.
	1.3 Carried out thread cutting on pipes in accordance to workplace procedure.
	1.4 Positioned G.I. Pipe runs at the corresponding areas as per plumbing plan.
	1.5 Tightened piping joints and fittings using appropriate tools and sealant.
	1.6 Installed clamps and fixtures along pipe runs in accordance with plumbing plan.
	1.7 Checked and corrected leaks and non-conformance to plumbing design/plans.
	1.8 Filled oversized holes and openings with cement plasters and finishing materials.
	1.9 Cleaned used tools & equipment and disposed excess and waste materials in accordance to workplace requirement.
2. Methods of Assessment	Competency should be assessed by:
	2.1 Written examination
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Workplace observation
	2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: CARRY OUT WATER SUPPLY LINE INSTALLATION USING PVC/UPVC PIPES	Nominal Duration: 44 hrs.	Unit Code: SEIP-CON-PLU-4-O

Unit Descriptor:

This unit covers the knowledge, skills and attitudes required to carry out water supply line installation using PVC/UPVC pipes. It specifically includes the tasks of gathering and inspecting of tools, equipment and materials, Performing PVC pipe cutting operation, Performing PVC pipe run Assembly and Cleaning/maintaining the work area.

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Gather and inspect tools, equipment and materials	1.1 **PPE** are selected and used. 1.2 **Tools, equipment and materials** are gathered and checked for usability. 1.3 PVC/UPVC pipe sizes/schedules are identified and gathered.
2. Perform PVC/UPVC pipe cutting operation	2.1 PVC /UPVC pipes are measured and marked as per plan/drawing specification. 2.2 PVC/UPVC pipes are clamped using appropriate clamping device. 2.3 PVC/UPVC pipes are cut using appropriate cutting tool. 2.4 PVC/UPVC pipes are cut within the specified dimension and considering specified tolerance.
3. Perform PVC/UPVC pipe run assembly	3.1 PVC/UPVC pipe runs are positioned on the corresponding location as per plumbing plan. 3.2 PVC/UPVC piping joints and fittings are assembled using appropriate tools and **sealant**. 3.3 Appropriate curing time for sealant after assembly of pipe joints and fittings is observed to create strong bond. 3.4 **Clamps and fixtures** along pipe runs are installed in accordance with plumbing plan. 3.5 Leaks and **non-conformance** to plumbing design/plans are checked and corrected. 3.6 Holes and openings are filled with cement plasters and **finishing.**
4. Clean/maintain the work area	4.1 Workplace, tools and equipment are cleaned and checked for normal operation. 4.2 Waste materials are disposed in accordance to workplace requirement

Range of Variables

Variable	Range
	May include but not limited to:
1. PPE	1.1 Safety helmet 1.2 Safety glass (google) 1.3 Safety shoes

	1.4 Hand gloves 1.5 Safety Belt 1.6 Safety glass 1.7 Apron 1.8 Appropriate clothing	
2. Tools, equipment & materials	2.1 Tools: 2.1.1 Measuring tape (5 mtrs.) 2.1.2 Steel rule 2.1.3 Vernier caliper 2.1.4 Adjustable wrench 2.1.5 Box wrench set 2.1.6 Pipe wrench 2.1.7 Pliers, mechanical 2.1.8 Tube cutter 2.1.9 Hand hacksaw 2.1.10 Screw driver: Star, flat, positive 2.1.11 Files 2.1.12 Spirit level 2.1.13 Pipe reamer	2.2 **E**quipment 2.2.1 Power hacksaw 2.2.2 Drill press 2.2.3 Grinder, angle 2.3 Materials 2.3.1 Coolant, water based 2.3.2 Soft stone (Marker) 2.3.3 Marking pen 2.3.4 Pencil 2.3.5 Solvent 2.3.6 Silicon sealant
3. Sealants	3.1 Thread tape (Teflon) 3.2 Solvents 3.3 Cement 3.4 Plastic seals 3.5 Rubberized seals 3.6 Synthetic seals	
4 Clamps and fixtures	4.1 Plastic C-clamp 4.2 Metallic C-clamp 4.3 Pipe hanger 4.4 Pipe sledge 4.5 Tapes	
5 Non-conformance	5.1 Leaks 5.2 Length 5.3 Pipe size 5.4 Pipe offset angles 5.5 Obstacles 5.6 Aesthetics/appearance	
6 Finishing	6.1 Caulk 6.2 Cement 6.3 Paint 6.4 Tiles/marble 6.5 Grommet	

Curricular Content Guide

1. Underpinning Knowledge	1.1 Methods and procedure of cutting concrete wall and floor to create pipe access
	1.2 Techniques of measuring and marking pipes
	1.3 Pipe and thread cutting procedure and appropriate cutting tools
	1.4 Types of pipe threads and their nomenclature
	1.5 Method of positioning and lay outing steel pipe runs
	1.6 Techniques and safety precautions of tightening steel piping joints and fittings using sealants
	1.7 Thread sealing techniques
	1.8 Methods and techniques of Positioning and lay outing UPVC pipe runs
	1.9 Tightening procedures for UPVC piping joints and fittings using solvents and curing
	1.10 Types, methods and techniques of filling holes and openings after plumbing works
2. Underpinning Skills	2.1 Measuring PVC/UPVC pipes and marking
	2.2 Clamping PVC/UPVC pipes
	2.3 Cutting PVC/UPVC pipes
	2.4 Cutting PVC /UPVC pipes within the specified dimension and considering specified tolerance
	2.5 Positioning PVC/UPVC pipe runs on the corresponding location as per plumbing plan
	2.6 Assembling PVC/UPVC piping joints and fittings using appropriate tools and sealant
	2.7 Observing appropriate curing time for sealant after assembly of pipe joints and fittings to create strong bond
	2.8 Installing pipe clamps and fixtures on pipe runs in accordance with plumbing plan
	2.9 Checking and correcting leaks and non-conformance to plumbing design/plans
	2.10 Filling holes and openings with cement plasters and finishing
	2.11 Cleaning used tools & equipment
3. Underpinning Attitudes	3.1 Patience
	3.2 Commitment to occupational health and safety practices
	3.3 Environmental concerns
	3.4 Eagerness to learn
	3.5 Tidiness and timeliness
	3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 Required plumbing tools for the job
	4.3 Pipes and fittings
	4.4 Materials necessary to carry out the job
	4.5 Work instruction sheet
	4.6 Pens
	4.7 Paper

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate:
	1.1 Clamped and cut PVC/UPVC pipes using appropriate clamping device and cutting tool.
	1.2 Observed specified dimension and tolerance when measuring and cutting pipes.
	1.3 Positioned PVC /UPVC pipe runs on the corresponding location as per plumbing plan.
	1.4 Assembled PVC/UPVC piping joints and fittings using appropriate tools and sealant.
	1.5 Observed appropriate curing time for sealant after assembly of pipe joints and fittings to create strong bond.
	1.6 Installed pipe clamps and fixtures on pipe runs in accordance with plumbing plan.
	1.7 Checking and correcting leaks and non-conformance to plumbing design/plans.
	1.8 Filled holes and openings with cement plasters and finishing.
2. Methods of Assessment	Competency should be assessed by:
	2.1 Written examination
	2.2 Demonstration
	2.3 Oral questioning
	2.4 Workplace observation
	2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency:	Nominal Duration:	Unit Code:
CARRY OUT SEWER PIPE LINE INSTALLATION	28 hrs.	SEIP-CON-PLU-5-O
Unit Descriptor:		
This unit covers the knowledge, skills and attitudes required to carry out sewer pipe line installation in construction sector. It specifically includes the tasks of planning out for sewer pipe line installation, gathering tools, equipment and materials, carrying out trenching and bedding works, laying sewer pipe, finishing final pipe run, cleaning/maintaining the work area.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Plan out for sewer pipe line installation	1.1 **Work activities** are confirmed by making site visit/inspection. 1.2 Pipe runs and elevation are identified in accordance with plumbing plans/specification. 1.3 Pipe line slope/pitch is determined in accordance with plumbing plans/specification and result of site visit.
2. Gather tools, equipment and materials	2.1 Required tools, equipment and materials are identified in accordance with plumbing plan and result of site visit/inspection. 2.2 Sewer pipe materials, sizes/schedules are identified and gathered. 2.3 **PPE** are selected and used. 2.4 **Tools, equipment** and materials are gathered and checked for usability.
3. Carry out trenching and bedding works	3.2 Trench/excavation area/line is laid out in accordance with plumbing plan and result of site visit. 3.3 Size of trench/excavation is made in accordance with workplace and plumbing plan requirement. 3.4 Grade/slope of trench is applied in accordance with workplace and plumbing plan requirement. 3.5 **Bedding material** is laid in accordance to workplace and plumbing plan requirement.
4. Lay sewer pipe	4.1 Sewer pipes are laid on the trench in accordance with workplace and plumbing plan requirements. 4.2 Bell ended sewer pipes are laid by placing the bell end at the uphill side of the pipe run. 4.3 PVC sewer pipes are installed by using appropriate **sealing/ gluing materials.** 4.4 Alignment and pipe elevation are checked in accordance to workplace and plumbing plan requirements.
5. Finish final pipe run	5.1 Fittings are installed to complete the final run of the sewer pipe installation. 5.2 Final pipe run is checked for leaks and **non-conformance** to workplace and plumbing line requirements. 5.3 Re-works or revision is made where necessary.

	5.4 **Covering materials** are laid on top of the sewer pipe run in accordance with workplace and plumbing plan requirement.
6. Clean/maintain the work area	6.1 Workplace, tools & equipment are cleaned and checked for normal operation. 6.2 Waste materials are disposed in accordance to workplace requirement.

Range of Variables

Variable	Range
	May include but not limited to:
1. Work activities	1.1 Area clearing 1.2 Traffic re-routing 1.3 Trenching/excavation 1.4 Tools and equipment gathering 1.5 Materials gathering and stacking 1.6 Concreting works
2. PPE	2.1 Safety helmet 2.2 Safety glass (google) 2.3 Safety shoes 2.4 Rubber/plastic boots 2.5 Hand gloves 2.6 Safety glass 2.7 Appropriate clothing

3. Tools and equipment	3.1 Tools:
	     3.1.1 Measuring tape (5 mtrs.)
	     3.1.2 Adjustable wrench
	     3.1.3 Box wrench set
	     3.1.4 Pipe wrench
	     3.1.5 Pliers, mechanical
	     3.1.6 Hand hacksaw
	     3.1.7 Screw driver: Star, flat, positive
	     3.1.8 Files
	     3.1.9 Spirit level
	     3.1.10 Pipe reamer
	     3.1.11 Cold chisel
	     3.1.12 Hammer
	
	     3.1.13 Levelling hose
	     3.1.14 Shovel/spade
	     3.1.15 Hand trowel
	     3.1.16 Pick and mattock
	     3.1.17 Safety line/warning tape
	 3.2 Equipment
	     3.2.1 Jackhammer
	     3.2.2 Excavating machine
	     3.2.3 Concrete cutter
	     3.2.4 Power hacksaw
	     3.2.5 Grinder, angle
	     3.2.6 Rammer/compactor

4. Bedding material	4.1 Sand 4.2 Gravel 4.3 Concrete 4.4 Bricks
5. sealing/gluing materials	5.1 Solvents 5.2 Cement 5.3 Plastic sealants 5.4 Rubber based sealants

	5.5 Synthetic sealants
	5.6 PVC primer
	5.7 Silicone sealants
6. Non-conformance	6.1 Leaks
	6.2 Pipe size
	6.3 Fitting size
	6.4 Pipe run slope/grade
	6.5 Pipe damage
7. Covering materials	7.1 Sand
	7.2 Gravel
	7.3 Concrete cement

Curricular Content Guide

1. Underpinning Knowledge	1.1 Piping run calculation procedure
	1.2 Procedure of Lay outing for trenching and excavation works
	1.3 Methods of determining and applying grade/slope for trenching
	1.4 Types of bedding materials and their function
	1.5 Methods and Procedure for Laying bedding material
	1.6 Procedure of Laying sewer pipes on the trench
	1.7 Methods and techniques of PVC Sewer pipes sealing/gluing
	1.8 Types of gluing and sealing materials used in sewer piping
	1.9 Alignment checking techniques for sewer pipes
	1.10 Types of sewer fitting and their uses
	1.11 Methods and techniques of installing sewer fittings
	1.12 Leak testing methods and procedures for sewer pipes and fittings
2. Underpinning Skills	2.1 Determining pipe run elevation and slope/pitch in accordance with plumbing plans/specification and result of site visit
	2.2 Lay outing the size of trench/excavation in accordance with workplace and plumbing plan requirement
	2.3 Applying grade/slope of trench in accordance with workplace and plumbing plan requirement
	2.4 Laying bedding material in accordance to workplace and plumbing plan requirement
	2.5 Laying sewer pipes on the trench in accordance with workplace and plumbing plan requirements
	2.6 Installing PVC Sewer pipes by using appropriate sealing/gluing materials
	2.7 Checking alignment and pipe elevation in accordance to workplace and plumbing plan requirement
	2.8 Installing fittings to complete the final run of the sewer pipe installation
	2.9 Checking final pipe run for leaks and non-conformance to workplace and plumbing plan requirements
	2.10 Cleaning work area, tools and equipment and proper waste

	disposal in accordance with workplace policy
3. Underpinning Attitudes	3.1 Patience 3.2 Commitment to occupational health and safety practices 3.3 Environmental concerns 3.4 Eagerness to learn 3.5 Tidiness and timeliness 3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual) 4.2 Required plumbing tools for the job 4.3 Pipes and fittings 4.4 Materials necessary to carry out the job 4.5 Work instruction sheet 4.6 Pens 4.7 Paper

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Determined pipe run elevation and slope/pitch in accordance with plumbing plans/specification and result of site visit. 1.2 Laid out the size of trench/excavation in accordance with workplace and plumbing plan requirement. 1.3 Applied grade/slope of trench in accordance with workplace and plumbing plan requirement. 1.4 Laid bedding material in accordance to workplace and plumbing plan requirement. 1.5 Laid sewer pipes on the trench in accordance with workplace and plumbing plan requirements. 1.6 Installed PVC Sewer pipes by using appropriate sealing/glueing materials 1.7 Checked alignment and pipe elevation in accordance to workplace and plumbing plan requirement 1.8 Installed fittings to complete the final run of the sewer pipe installation 1.9 Checked final pipe run for leaks and non-conformance to workplace and plumbing plan requirements 1.10 Laid covering materials on top of the sewer pipe run in accordance with workplace and plumbing plan requirement
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **CARRY OUT PLUMBING FIXTURES INSTALLATION**	Nominal Duration: 60 hrs.	Unit Code: SEIP-CON-PLU-6-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to carry out plumbing fixtures installation in construction sector. It specifically includes the tasks of preparing for plumbing fixture installation, gathering tools, equipment and materials, installing a new toilet bowl (commode), installing other plumbing fixtures and cleaning/maintaining the work area.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Prepare for plumbing fixture installation	1.1 **Work activities** are confirmed in accordance with plumbing plan and workplace requirements. 1.2 Work site is visited and prepared prior to installation works. 1.3 **Plumbing fixture** is determined, collected and checked for workability and quality.
2. Gather tools, equipment and materials	2.1 Required **tools, equipment** and materials are identified in accordance with plumbing plan and result of site visit/inspection. 2.2 Plumbing fixtures to be installed are gathered in the work site. 2.3 **PPE**s are selected and used. 2.4 Tools, equipment and materials are gathered and checked for usability.
3. Install a new toilet bowl (commode)	3.1 Toilet bowl flange is installed securely making sure the bolts are in place. 3.2 A new wax ring is placed at the bottom of the toilet bowl accurately. 3.3 The new toilet bowl is placed on the flange aligning the bolt holes with the bolts of the flange and wax ring in its proper place. 3.4 Nuts with washers are tightened squarely without over tightening. 3.5 Apply additional **sealing material** around the base of the bowl in accordance to workplace requirements. 3.6 The water closet tank is installed on the bowl in accordance with manufacturer's instruction.
4. Install other plumbing fixtures	4.1 Plumbing fixtures are installed in accordance with plumbing plan and following manufacturer's instruction/specification. 4.2 Check newly installed plumbing fixtures for leaks and **non-conformance** with workplace requirements. 4.3 Reworks/adjustment is carried out in accordance with workplace requirements.
5. Clean/maintain the work area	5.1 Workplace, tools and equipment are cleaned and checked for normal operation. 6.3 Waste materials are disposed in accordance to workplace requirement.

Range of Variables

Variable	Range
	May include but not limited to:
1. Work activities	Installing/repairing of: 1.1 Toilet bowl (commode) 1.2 Shower 1.3 Bath tubs 1.4 Wash basin 1.5 Kitchen sink 1.6 Urinals 1.7 Water closet 1.8 Bidets 1.9 Drinking fountains 1.10 Terminal valves/faucets
2. Plumbing fixture	2.1 Toilet bowl (commode) 2.2 Shower 2.3 Bath tubs 2.4 Wash basin 2.5 Kitchen sink 2.6 Urinals 2.7 Water closet 2.8 Bidet 2.9 Drinking fountains 2.10 Terminal valves/faucets

3. Tools and equipment	3.1 Tools:
	  3.1.1 Measuring tape (5 mtrs.)
	  3.1.2 Adjustable wrench
	  3.1.3 Box wrench set
	  3.1.4 Pipe wrench
	  3.1.5 Pliers, mechanical
	  3.1.6 Hand hacksaw
	  3.1.7 Screw driver: Star, flat, positive
	  3.1.8 Files
	
	  3.1.9 Spatula (metal)
	  3.1.10 Spirit level
	  3.1.11 Pipe reamer
	  3.1.12 Cold chisel
	  3.1.13 Hammer
	
	1.1 Equipment
	  1.1.1 Concrete cutter
	  1.1.2 Grinder, angle
	  1.1.3 Electric drill

4. PPE	4.1 Hard hat (Skull guard) 4.2 Safety glass (receptacles) 4.3 Hand gloves 4.4 Safety shoes 4.5 Apron 4.6 Working clothes
5. Sealing material	5.1 Concrete/Cement 5.2 Rubber grommet 5.3 Plastic grommet 5.4 White cement 5.5 Wax seal 5.6 Rubber-based seal

	5.7 Silicone seal
	5.8 Plastic sealants
	5.9 Synthetic sealants
6. Non-conformance	6.1 Leaks
	6.2 Damaged fixtures
	6.3 Broken/damaged fittings
	6.4 Wrong Pipe size
	6.5 Wrong Fitting size
	6.6 Damage flooring/walls

Curricular Content Guide

1. Underpinning Knowledge	1.1 Types of plumbing fixtures and their functions
	1.2 Procedure of installing toilet bowl/commode flange
	1.3 Procedure of installing the toilet bowl and closet tank
	1.4 Tightening techniques for toilet bowls to avoid damage/breakage
	1.5 Care in the installation of ceramic type plumbing fixtures
	1.6 Methods and procedures of installing different types of plumbing fixtures
	1.7 Leak testing and qualifying workmanships in plumbing fixture installation
2. Underpinning Skills	2.1 Gathering installed plumbing fixtures in the work site
	2.2 Installing toilet bowl flange securely making sure the bolts are in place
	2.3 Placing the new toilet bowl on the flange aligning the bolt holes with the bolts of the flange and wax ring in its proper place.
	2.4 Tightening squarely the nuts with washers without overtightening
	2.5 Installing the water closet tank on the bowl in accordance with manufacturer's instruction
	2.6 Installing other plumbing fixtures in accordance with plumbing plan and following manufacturer's instruction/specification
	2.7 Checking newly installed plumbing fixtures for leaks and non-conformance with workplace requirements
	2.8 Carrying out reworks /adjustment in accordance with workplace requirements
3. Underpinning Attitudes	3.1 Patience
	3.2 Commitment to occupational health and safety practices
	3.3 Environmental concerns
	3.4 Eagerness to learn
	3.5 Tidiness and timeliness
	3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 Required plumbing tools for the job
	4.3 Pipes and fittings

	4.4 Materials necessary to carry out the job 4.5 Work instruction sheet 4.6 Pens 4.7 Paper

Assessment Evidence Guide

1. Critical Aspects of Competency	Assessment required evidence that the candidate: 1.1 Gathered installed plumbing fixtures in work site. 1.2 Installed toilet bowl flange securely making sure bolts are in place. 1.3 Placed the new toilet bowl on the flange aligning the bolt holes with the bolts of the flange and wax ring in its proper place. 1.4 Tightened squarely the nuts with washers without over tightening. 1.5 Installed the water closet tank on the bowl in accordance with manufacturer's instruction. 1.6 Installed other plumbing fixtures in accordance with plumbing plan and following manufacturer's instruction/specification. 1.7 Checked newly installed plumbing fixtures for leaks and non-conformance with workplace requirements. 1.8 Carried out reworks /adjustment in accordance with workplace requirements.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

Unit of Competency: **PERFORM PRESSURE TESTING OF PIPING SYSTEM**	Nominal Duration: 24 hrs.	Unit Code: SEIP-CON-PLU-7-O
Unit Descriptor: This unit covers the knowledge, skills and attitudes required to perform pressure testing of piping system in construction sector. It specifically includes the tasks of preparing for pressure testing, gathering tools, equipment and materials, carrying out pressure testing and cleaning/maintaining the work area.		

Elements and Performance Criteria:

(Terms in the performance criteria that are written in **bold and underlined** are elaborated in the range of variables).

Elements of Competency	Performance Criteria
1. Prepare for pressure testing	1.1 **Work activities** are identified in accordance with plumbing plan and workplace requirements. 1.2 Maximum test pressure is determined in accordance with plumbing plan/design specification. 1.3 **Pressure testing method** is identified in accordance with plumbing plan/workplace requirements. 1.4 Piping system connections are reviewed and checked for tightness/integrity. 1.5 Devices, fixture or components in the piping systems that needs to be isolated is shut off to avoid damage.
2. Gather tools, equipment and materials	2.1 Required **tools, equipment** and materials are identified in accordance with plumbing plan and workplace procedure on pressure testing. 2.2 Pressure testing tools, equipment and materials are collected and checked for usability/accuracy. 2.3 **PPE**s are gathered and strictly used.
3. Carry out pressure testing	3.1 Preliminary, intermediate and final test pressures is applied progressively into the system in accordance with workplace pressure testing plan/procedure. 3.2 Appropriate **Leak testing method** is applied or each applied pressure to determine presence of leaks. 3.3 Report leak testing result with immediate superior. 3.4 Record test results in accordance with workplace requirements. 3.5 Safety precaution is observed when performing pressure testing.
4. Clean/maintain the work area	4.1 Workplace, tools and equipment are cleaned and checked for normal operation. 4.2 Waste materials are disposed in accordance to workplace requirement.

Range of Variables

Variable	Range
	May include but not limited to:
1. Work activities	1.1 Checking tightness of valves/fittings 1.2 Measuring pipe runs 1.3 Identifying piping run which are subject for pressure testing 1.4 Identifying fittings to be isolated 1.5 Isolating system components
2. Pressure testing method	2.1 Pneumatic testing method 2.2 Hydrostatic testing

3. Tools and equipment	3.1 Tools:
	     3.1.1 Measuring tape (5 mtrs.)
	     3.1.2 Adjustable wrench
	     3.1.3 Box wrench set
	     3.1.4 Pipe wrench
	     3.1.5 Pliers, mechanical
	     3.1.6 Screw driver: Star, flat, positive
	     3.1.7 Pressure gauge
	     3.1.8 Quick connect couplers/adapters
	 3.1 Equipment
	     3.1.1 Air compressor
	     3.1.2 Water pump
	     3.1.3 Nitrogen pump/tank

4 PPE	4.1 Hard hat (Skull guard) 4.2 Safety glass (receptacles) 4.3 Hand gloves 4.4 Safety shoes 4.5 Apron 4.6 Working clothes
5 Leak testing method	5.1 Soup-sud solution 5.2 Using leak testing instrument 5.3 Observing pressure changes

Curricular Content Guide

1. Underpinning Knowledge	1.1 Method/procedure of pressure testing 1.2 Allowable pressure required when performing piping leak test 1.3 Pressure testing/equipment tools and their applications 1.4 Procedure of applying pressure in a piping system 1.5 Checking pressure testing tools, equipment and materials for usability/accuracy 1.6 Applying preliminary, intermediate and final test pressures progressively into the system in accordance with workplace pressure testing plan/procedure 1.7 Applying appropriate leak testing method for each intermediate pressure to determine presence of leaks. 1.8 Reporting leak testing result to immediate superior

	1.9 Recording test results in accordance with workplace requirements
	1.10 Observing safety precaution when performing pressure testing record test results in accordance with workplace requirements
2. Underpinning Skills	2.1 Determining maximum test pressure in accordance with plumbing plan/design specification
	2.2 Identifying pressure testing method in accordance with plumbing plan/workplace requirements
	2.3 Checking pressure testing tools, equipment and materials for usability/accuracy
	2.4 Applying preliminary, intermediate and final test pressures progressively into the system in accordance with workplace pressure testing plan/procedure
	2.5 Applying appropriate leak testing method for each intermediate pressure to determine presence of leaks.
	2.6 Reporting leak testing result to immediate superior
	2.7 Recording test results in accordance with workplace requirements
	2.8 Observing safety precaution when performing pressure testing record test results in accordance with workplace requirements
3. Underpinning Attitudes	3.1 Patience
	3.2 Commitment to occupational health and safety practices
	3.3 Environmental concerns
	3.4 Eagerness to learn
	3.5 Tidiness and timeliness
	3.6 Respect for rights of peers and seniors in workplace
4. Resource Implications	4.1 Workplace (simulated or actual)
	4.2 Required plumbing tools for the job
	4.3 Pipes and fittings
	4.4 Materials necessary to carry out the job
	4.5 Work instruction sheet
	4.6 Pens
	4.7 Paper

Assessment Evidence Guide

1. Critical aspects of Competency	Assessment required evidence that the candidate:
	1.1 Determined maximum test pressure in accordance with plumbing plan/design specification.
	1.2 Identified pressure testing method in accordance with plumbing plan/workplace requirements.
	1.3 Checked Pressure testing tools, equipment and materials for usability/accuracy.
	1.4 Applied preliminary, intermediate and final test pressures progressively into the system in accordance with workplace pressure testing plan/procedure.
	1.5 Applied appropriate leak testing method for each intermediate pressure to determine presence of leaks.

	1.6 Report leak testing result with immediate superior.
	1.7 Record test results in accordance with workplace requirements.
	1.8 Observed safety precaution when performing pressure testing record test results in accordance with workplace requirements.
2. Methods of Assessment	Competency should be assessed by: 2.1 Written examination 2.2 Demonstration 2.3 Oral questioning 2.4 Workplace observation 2.5 Portfolio
3. Context of Assessment	3.1 Competency assessment must be done in a training center or in an actual or simulated work place after completion of the training module.

End of Competency Standard

Assessment Guide

A Framework for Effective Assessment

Plumbing

How to Use this Assessment Guide

- This Assessment Guide presents need-to-know information for Assessors and others who want to know more about the assessment process. A handy Table of Contents Guide on the next page shows you where to look.

- If you want the basics of assessment, its key terms and definitions, in a Question & Answer (Q&A) format, see Section One.

- If you want a knowledge of who does what, the key roles and responsibilities involved in assessment, see Section Two.

- If you want a "toolbox" of tools and templates, that you can select from depending on your assessment need, see Section Three.

- If you want to look at working samples of completed assessment tools, see the Appendices.

Table of Contents

Section One: Q&A linked to Key Terms & Definitions

Section Two: Roles and Responsibilities

Section Three: Tools and Templates

Assessment Guide

Section One: Objectives linked to Key Terms & Definitions

Define assessment.

Assessment is a systematic process of collecting proof or evidence on whether or not a candidate has demonstrated competence in the performance of a work-related activity/task that is directly linked to a performance standard. The assessment confirms that the individual can perform to the standard expected in the workplace and/or the nationally approved competency standard.

Give an example of assessment.

A helpful example in this regard is the driving test. The driver must prove his competence to drive by demonstrating to the driving assessor his ability to do so. The driving assessor uses a checklist to assess the candidate and make the necessary recommendations, based on the evidence he has collected in observing the candidate's driving. S/He either records/recommends that the candidate is **competent** or **not yet competent.**

What is the purpose of assessment?

The Purpose of Assessment is to confirm that a trainee can perform competently to the standards expected in the workplace.

What is Assessment based on?

- An effective Assessment is based on a Competency Standard.
- A Competency Standard describes the skills, knowledge, and attitudes needed to perform effectively in the workplace, not the classroom.

Define the term "competency."

Competency is the ability to do a task successfully. Aspects of competency include:

- The capacity to perform tasks to the required standard consistently
- The ability to respond to different needs in the workplace
- The ability to plan and integrate a variety of tasks to attain a work outcome
-

Describe what makes up a competency standard.

It must be noted that a competency standard is made up of individual units of competency that include elements of competency as well as the performance criteria needed to accomplish them.

Define the term "Assessment tool."

An assessment tool is, in effect, an evidence-gathering tool. It contains both the instrument used for the assessment and instructions for gathering evidence in the assessment process. As an assessment instrument it contains the context and conditions for the assessment; tasks to be administered to the learner; an outline of the evidence to be gathered for the learner; the criteria for judging the evidence; and the necessary housekeeping records for recording and reporting requirements.

Describe the difference between Conventional Testing & Competency Based Assessment.

Conventional Testing	CBT Assessment
- Emphasis on knowledge/memorization - Teachers/Training Providers have main role - Theory & practical Tests can become outdated - High cost & central control - Relatively inflexible	- Based on competency standards - Involve industry partners in crucial role - Assessment based on demonstration of work skills rather than classroom knowledge - Flexible delivery - Competencies widely recognized - Guidelines & Templates used

Describe briefly what makes up an assessment system.

An Assessment System must be understood as a well-coordinated set of documented policies and procedures, including assessment materials and tools, that ensure assessments are consistently valid, reliable, flexible, fair, and safe.

Define the purpose of the Assessor role.

The role of Assessor is the heart and soul of effective competency based assessment. Without this pivotal role, determining the competency of the trainee is mere guesswork.

Note:

- The Industry Assessor will be asked to provide specs and practical demonstration tests from his workplace that will provide the evidence for determining competency.
- The importance of this input cannot be overemphasized for it best matches and tests the required performance criteria from the Standard.

Describe the basic questions that an Assessor must ask when planning an Assessment.

Planning an Assessment: What Needs to Happen?

- Determine which Units of Competency need to be assessed?
- Determine what Assessment Methods will be used?
- Determine what evidence-based tools (specs) need to be developed by the Assessor to guide the assessment?
- Determine how long it will take?
- Determine when the assessment will occur?
- Determine where the assessment will take place?
- Determine how it will be recorded?

Give some Assessor Requirements/Competencies.

Requirements/Competencies of an Assessor-

- The ability to use assessment tools to gather evidence effectively is essential, adjusting the language where necessary to reflect the language/literacy/numeracy levels of the workplace and not to exceed them in order to ensure learner understanding. This will also entail an ability to respond to learner needs such as responding to learner disability.

- The skill to develop specifications and practical tests, based on performance criteria, that provide evidence of competency that will fast track the assessment process.
- The ability to clearly demonstrate current industry skills and competencies relevant to the Standard.

- The Assessor is selected/appointed by Industry to act as an Assessor because of his proven competencies.
- Knows what needs to be done to assess the performance criteria
- Demonstrates a high level of expertise in the technical area to be examined
- Can provide constructive feedback

Define the challenges of the Assessor Role.

Assessor Role: Challenges

- Needs to be objective and unbiased
- Must have interpersonal skills to relax nervous candidates or deal with those who are aggressive or emotional
- Must have ability to deal with those who have literacy problems or difficult dialect

Review some basic need-to-know elements concerning assessment.

Assessment Basics: Need to Know Elements

- Assessment to be conducted by Industry Assessor selected by industry
- Industry assessor must be familiar with units of competency outlined in the course standards
- Industry Assessor should drafts specs that reflect industry requirements for trainees and that are based on critical aspects of competency
- Industry assessor is responsible for making final judgment of **competent** or **not yet competent**
- Trainer will assist industry assessor
- Trainees must demonstrate competence based on the units of competency outlined in the standards

- All resources related to units of competency must be made available prior to the assessment event, e.g., tools, equipment, materials

Describe the trainer's role in the assessment process.

The Trainer acts as a primary resource for the Assessor and acts as a Facilitator.

Trainer ensures:

- All industry required tools, equipment, and materials are available for the assessment
- The training venue is booked and has sufficient space for demonstrations/tasks
- That all logistics such as admission slips, signature sheets, and records are readily available for distribution and collection
- That all teaching materials and Standard documents and Assessment tools are ready for the Assessor

Discuss the importance of principles of assessment and what is involved.

Principles of Assessment Table

Key Principles	Relevance/Meaning
Valid	Ensures assessment aligned with the Unit of Competency and is based on evidence that shows the learner can demonstrate skills and knowledge in other similar contexts (workplace)
Reliable	Evidence presented for assessment is consistently interpreted regardless of the Assessor
Flexible	Assesses competencies held by the learner regardless of where they have been acquired; reflects the individual learner's needs
Fair	The individual learner's needs or disability is considered in the assessment process; the learner is provided with information about the assessment process and given the opportunity to challenge the result of the assessment if warranted
Safe	

| | The assessor has inspected the venue for assessment and determined that it is safe for all involved and that emergency evacuations are in place if needed |

Define the term "evidence."

Evidence is information that is gathered and matched against a Unit of Competency to provide proof of competency.

State the different forms of evidence that can be collected.

Different forms of evidence that can be collected are-

- **Direct** such as demonstration test, or observation of Candidate
- **Indirect** such as Candidate's self-assessment or third party reports such as an employer interview

Describe and outline what is involved in "rules of evidence" and why they are important.

Rules of Evidence Table

Rules of Evidence	Meaning
Valid	The assessor is given assurance that the learner possesses the skills, knowledge, and attitudes described in the Unit of Competency and related assessment requirements
Sufficient	The assessor is assured that the quality, quantity, and relevance of the evidence is sufficient to enable a judgment to be made on the learner's competency
Authentic	The assessor is assured that the evidence provided for assessment is the learner's own work
Current	The assessor is assured that the assessment evidence demonstrates current competency of the learner. This evidence must be from the present or very recent past.

Describe the purpose of evidence gathering tools.

The Purpose of evidence gathering tools are-

- To help candidates understand what is expected of them
- To provide a focus for the assessment
- To identify what is needed to verify competency

State the use of the evidence guide.

The evidence guide provides useful advice on Unit of Competency assessment and must be read in conjunction with the performance criteria, required underpinning skills/knowledge/attitudes, range statement, and the critical aspects of competency for the Standard.

State why assessment evidence is important.

Evidence is the information gathered that provides proof that the performance criteria of a unit of competency has been met. Evidence can take many forms:

- **Observation:** watching the trainee perform
- **Questioning:** asking the trainee questions
- **Demonstration of specific skills:** seeing how the trainee performs a procedure or creates a final product
- **Examining** previous work the trainee has done

Describe the kinds of Assessment Methods that can be used for Evidence gathering purposes.

Various kinds of Assessment Methods can be used for Evidence gathering purposes. A wide range of assessment methods are available for Evidence- gathering purposes. Assessment methods are not limited to those listed below. The greater the range of assessment methods applied, the better the accuracy of the assessment.

Assessment Methods Table

Methods	Examples
Direct Observation of Candidate	Actual real-time activities in the workplace Work activities in a simulated workplace/training center
Questioning	Written questions; interviews; self-evaluation with questions; verbal questioning; questionnaires
Evidence compiled by Candidate	Portfolio; collection of work samples; products with supporting documentation; logbooks; information about life experience
Methods	Examples
Review of Product	Work samples and products; products as a result of a demonstration test/spec
Third Party Feedback	Reports/testimonials from Employers and Supervisors; evidence of training; interviews with Employers and Supervisors

Advice to the Assessor: use these methods and examples as a means of making your assessment valid, reliable, flexible, fair, and safe.

Define the term "evidence gathering tools" and give some examples of these tools.

Evidence gathering tools are the actual instruments that the Assessor uses to collect evidence. Evidence may be collected through:

- Demonstration of work activity

- Observation Checklist
- Question List
- Third party reports e.g. supervisor to verify consistent performance
- Review of candidate's portfolio
- Verifying the Candidate's capacity to deal with contingencies (unexpected things that come up)
- Written test

Define the term "portfolio."

A collection of evidence that may be presented by the Candidate to an Assessor to prove the Candidate's competence at a job or task.

What are some examples of Portfolio Evidence?

- Training results and certificates
- Training workbooks
- References from employers
- Job description and work experience
- Photos and videos
- Work journals
- Awards
- Work samples
- Letters and memos

Outline a 6-step method for preparing an evidence plan.

Steps in Preparing an Evidence Plan (Sequence of Steps to Follow)-

The Evidence Plan is the most important planning tool for an Assessor. A good evidence plan generates a list of the evidence that the Assessor must gather when conducting the assessment for a specific Unit of Competency. The following 6-Point Method for preparing an Evidence Plan provides a useful sequence of inter-related steps to follow:

1. Select Unit of Competency for assessment
2. Read full Unit of Competency
3. Identify evidence requirements based on:
   a. Elements and Performance Criteria
   b. Dimensions of Competence

       c. Underpinning skills knowledge

       d. Critical aspects of competency

4. Develop a list of evidence requirements
5. Identify best ways of collecting evidence (tools)
6. Document evidence plan

Outline the steps (sequence of activities) involved in developing an assessment tool.

Following are the steps (sequence of activities) involved in developing an assessment tool:

1. Select the Unit of Competency
2. Read the Unit of Competency
3. Identify the required evidence: critical aspects of competency
4. Identify the evidence gathering method
5. Complete the evidence plan
6. Select the appropriate template
7. Complete the template
8. Check the evidence gathering tools against the evidence plan and Unit of Competency
9. Check the tool with another Assessor for his opinion

Describe the four dimensions of competency.

Task Skills: the capacity to perform tasks in the workplace and demonstrate competence that meets the required Standard;

Task Management Skills: the ability to plan and integrate several tasks simultaneously that achieve a desired work outcome such as those skills involved in budgeting for a work operation, securing supplies and equipment for the work operation, completing the task in a timely, cost-effective manner, and ensuring safety practices are followed throughout;

Contingency Management Skills: the ability to respond to crises and breakdowns in the workplace, such as accidents and emergency situations that are unanticipated and require immediate action and resolution;

Job/Role Environment Skills: the capacity to own the responsibilities and expectations of the work environment that involves working with others effectively and participating in creating a work culture where all can contribute their best within the parameters of their job role

Assessment Guidelines

Section Two: Roles and Responsibilities

The Assessment System: Planning Guide for the Assessor

An Assessment System must be understood as a well-coordinated set of documented policies and procedures, including assessment materials and tools, that ensure assessments are consistently valid, reliable, flexible, fair, and safe.

Competency Assessment is a systematic process of collecting proof or evidence on whether or not a candidate has demonstrated competence in the performance of a work-related activity/task that is directly linked to a performance standard. The assessment confirms that the individual can perform to the standard expected in the workplace and/or the nationally approved competency standard.

Each **Unit of Competency** contained in a Standard describes a distinct part of a Mason's work and job profile. Within each Unit of Competency, the following components appear:

- Unit Title
- Unit Descriptor

- Elements of Competency
- Performance Criteria
- Range of Variables
- Evidence Guide

As a prelude to conducting assessments, the Assessor must be thoroughly familiar with all of the particulars and details of the Unit of Competency that is being assessed. This is a "must" for the role of the Assessor. He must be especially familiar with the Evidence Guide for gathering critical information.

The three sample assessment tools found below focus on the critical aspects of competency that can provide the required evidence to determine competency- the evidence guide. These sample assessment tools are as follows:

- Demonstration Checklist
- Observation Checklist
- Oral Questions Checklist

The duties of the Assessor include:

- Covering all of the key elements of the Unit of Competency under assessment
- Applying rigorously the Evidence Guide for the Unit of Competency as this contains the method and context of assessment, resources required for the assessment, the critical aspects of competency, and the required underpinning knowledge, skills, and attitudes
- Developing specifications (specs) for the task sheet for Demonstration as required
- Requiring the candidate to perform project tasks that cover interrelated units of competency-known as a "clustering."
- Making what can be termed "reasonable adjustments" for candidates with disabilities or for example, those candidates with regional dialects that prove difficult to understand

Note: These "reasonable adjustments" may involve reconfiguring a simulated workplace site so that a candidate's disability does not impede the assessment process, or for example, finding someone who can understand a regional dialect and assist the Assessor with essential communication skills.

Roles and Responsibilities of Assessor

Prior to any assessment, the Assessor should follow the specific instructions below to ensure a well-planned assessment event. In most cases s/he will be assisted by a Trainer. Nevertheless, s/he should make certain that good preparation has taken place for the assessment event.

1.   Visit the assessment venue or workplace to ensure an adequate work area or platform containing:

- Sufficient space for working- ensure square meters of work space enough for task to be carried out effectively and safely
- Fire extinguisher and safety equipment within reach
- Emergency procedures in place
- All necessary tools, equipment, and materials ready at hand
- All necessary machinery in good working order

2.   Assessment is drawn and extracted from the relevant Unit of Competency based on an approved Standard and on an Evidence plan that clearly focuses on critical aspects of competency.

3.   The duration of time to assess the demonstration is clearly indicated,   for example, 3 hours. This information is shared with the Candidate along with other pertinent information such as the sequence of tasks that he must follow, and the fact that he will be closely observed as the tasks are performed.

4.   After the Candidate has performed the task, the Assessor will provide feedback to the Candidate on his performance.

5.   The responsibility on finally deciding whether or not the Candidate was Competent or Not Yet Competent belongs to the accredited Assessor.

6.   At the conclusion of the assessment, the Assessor will provide feedback on whether or not the Candidate was Competent or Not Yet Competent. S/He will also share information on next steps. These next steps include where to obtain the certificate related to the assessment or, if unsuccessful, how to re-try for competency within a specified period of time.

Roles and Responsibilities of Trainer

Prior to the assessment, you will have studied and become familiar with the Competency Standard for the industry occupation. You will also have met with or contacted the Assessor beforehand and discussed preparations and arrangements for the assessment. Your role will be to facilitate the assessment process and ensure all necessary resources are available, assisting the Assessor wherever possible. For example, once a draft spec has been produced by the Assessor, you will ensure it is fully consistent with the evidence plan and copied appropriately for use by both the Assessor and Candidate.

In addition to a confirming a suitable training venue and time, you will ensure that:

- Sufficient space is allotted for task work- square meters of work space enough for demonstration tasks to be carried out effectively and safely
- Fire extinguisher and safety equipment within reach if necessary
- Emergency procedures in place
- All necessary tools, equipment, and materials ready at hand
- All necessary machinery in good working order

Your duties include:

- **notifying** the Assessor and candidates of planned assessment events and their location
- **advising and assisting** the Assessor on planned assessment events
- **collecting** admission slips and signature sheets for assessment events
- **ensuring** all required forms and reporting mechanisms are in place and ready for distribution to the Assessor and to the Candidate
- **ensuring** all requisite forms are duly signed and forwarded to the SEIP Office, or certifying body
- **responding** to candidate queries and concerns such as re-assessment procedures
- **reconfiguring** workplace simulations so that candidates with disabilities are able to participate fully and without impediment
- **working** closely with the SEIP contact to ensure a successful assessment event

Roles and Responsibilities of Candidate

Prior to the assessment, you will have studied and become familiar with the Competency Standard for your industry.

1. Initially, you will be given information on the task you are to perform, and the estimated time you will require to perform it. These tasks are based on the critical aspects of competency related to the performance criteria within the approved Competency Standard.

Given the necessary instructions, and/or a task-related spec and the necessary tools, materials, and equipment, you will carry out and complete a work task. You will observe that there is:

- Sufficient space for working- square meters of work space enough for task to be carried out effectively and safely
- Fire extinguisher and safety equipment within reach if necessary
- Emergency procedures in place
- All necessary tools, equipment, and materials ready at hand
- All necessary machinery in good working order

2. Assessment is drawn and extracted from the relevant Unit of Competency based on the approved Competency Standard and on an Evidence plan (proof of competence) developed by the Assessor that

clearly focuses on critical aspects of competency. The Evidence plan will be based on critical assessment tools such as demonstration/task; observation; oral questions.

3.   The duration of time to assess the demonstration should be clearly indicated, for example, 3 hours. This information will be given to you along with other pertinent information such as the procedure or sequence of tasks that you must follow. It is important to note that you will be closely observed and assessed throughout the duration of your demonstration. You will be given time to ask questions and request clarification. You will also be given 10 minutes to familiarize yourself with the resources to be used in the assessment.

4.   Based on your performance in demonstrating the task, you will be assessed by the Assessor to be Competent or Not Yet Competent. Regardless of the result you will be given feedback from the Assessor on your performance and the next steps.

5.   After you have performed the task, the Assessor will provide feedback to you on your performance.

6.   The responsibility on finally deciding whether or not you are Competent or Not Yet Competent belongs to the accredited Assessor.

7.   At the conclusion of the assessment, the Assessor will provide feedback on whether or not you have been assessed to be **Competent** or **Not Yet Competent**. Both your signatures will be required on the Assessment Form. You will also be allowed to make comments on the Assessor's decision. The Assessor will then share information on next steps. These next steps include where to obtain the certificate related to the successful assessment or, if unsuccessful, how to re-try for competency within a specified period of time.

Section Three: Tools and Templates

This toolbox of Tools and Templates offers a wide range of assessment tools that will facilitate evidence gathering and other assessment-related needs. Evidence gathering, however, should not be limited to these tools and templates alone. The toolbox should be revised or expanded as necessary, to include other tools and templates that are deemed relevant.

- Demonstration Checklist
- Observation Checklist
- Oral Questions Checklist
- Evidence Plan (Overall Summary)
- Assessor Job Sheet and Specifications (Spec) Form
- Competency Assessment Results
- Assessor Planning Checklist Tool
- All About Questioning Techniques for Use in Assessment
- Quick Guide to Conducting Competency Assessments
- Assessor's Quick Start

Demonstration Checklist

Candidate's name:	
Assessor's name:	
Qualification:	
Project-Based Assessment Title	
Units of competency covered:	
Date of assessment:	
Time of assessment:	

Instructions for demonstration
Please see attached Instruction for Demonstration (Candidate/Assessor)

Supplies and Materials	Tools and equipment
▪ Please refer to attached specific instruction	• Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐
•	☐	☐	☐

Observation Checklist

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	
Code:	
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Candidate's performance was:	COMPETENT	NOT YET COMPETENT
Feedback to Candidate:		

Candidate's Signature:	Date:
Assessor's Signature:	Date:

Oral Questions Checklist

Candidate's name:	
Assessor's name	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	
Reference Standard:	

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for competent/non yet competent.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	YES	NO
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Feedback to Candidate:

Candidate's overall performance was (circle):	Satisfactory	Not Satisfactory
The Candidate's underpinning knowledge was (circle):	Satisfactory	Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

EVIDENCE PLAN: Overall Summary

QUALIFICATION:					
Project-Based Assessment Title					
Units of competency covered					
Ways in which evidence will be collected: [tick the column] The evidence must show that the candidate ……	Observation with Questioning	Demonstration with Questioning	Written Examination	Portfolio
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				
•				

Assessor Job Sheet and Specifications (Spec) Form

This Spec is in reference to the_____ Standard, and has been developed by an Industry Representative/Assessor.

The Result* indicates either C for Competent, or NYC for Not Yet Competent.

Unit of Competency	Elements Reviewed	Critical Aspects of Competency Covered	Result*: C/NYC

JOB #1 Procedure for Developing Specification (Spec): List the steps involved in performing the task/spec successfully. It will cover, in logical order, the critical aspects of competency listed above that will determine if the candidate is **Competent** or **Not Yet Competent.**

1.	
2.	
3.	
4.	
5.	

Tools and Equipment Required for Spec completion: List all tools, equipment, and materials required in completing Job #1:

Tools	Equipment	Materials

Assessor Name: Date:

Competency Assessment Results

Candidate's name:	
Assessor's name	
Qualification Title:	
Date of Assessment:	
Assessment Venue:	
Reference Standard:	
Unit of Competency:	

Assessment Unit	Competent	Not Yet Competent

Assessor's Recommendation and Comments:

Overall Assessment:

Yes: The Candidate successfully met the required evidence/standards and demonstrated all of the competencies necessary for certification in the Qualification and Units of Competency listed above.

No: The Candidate did not meet the evidence requirements. Re-assessment is recommended.

Assessor Signature:	Date:
Candidate Signature:	Date:
Assessment Center Manager Signature:	

ASSESSMENT PLANNING CHECKLIST TOOL

Assessor's name:	
Date:	

Directions: Circle the 'Yes' or 'No' response to each item.

1.	The Assessor is familiar with the unit(s) of competency being assessed	Yes	No
2.	The Assessor has verified that the workplace or training center has the correct equipment, machinery, tools, and materials necessary to complete all of the relevant aspects of the unit of competency	Yes	No
3.	The Assessor has ensured that all materials and equipment were assembled and arranged in advance.	Yes	No
4.	The Assessor has all the necessary tools, templates, and specifications needed to assess the trainee including a variety of assessment tools covering practical demonstration, observation, oral question, and (where necessary) written tests relevant to the competency specified in the standard	Yes	No
5.	The Assessor has met with the trainer prior to the assessment event to discuss his/her role.	Yes	No
6.	The Assessor will discuss the performance test with the trainee and address any concerns prior to giving the test	Yes	No
7.	The Assessor will discuss and record with the trainee the results of their performance	Yes	No

Action to be taken on "No" responses:

General Guidelines for Effective Questioning

- Keep questions short and focused on one key concept
- Ensure that questions are structured
- Test the questions to check that they are not ambiguous
- Use `open-ended questions such as `what if...?' and `why...?' questions, rather than closed questions
- Keep questions clear and straight forward and ask one at a time
- Use words that the candidate is able to understand
- Look at the candidate when asking questions
- Check to ensure that the candidate fully understands the questions
- Ask the candidate to clarify or re-phrase their answer if the assessor does not understand the initial response
- Confirm the candidate's response by repeating the answer back in his/her own words
- Encourage a conversational approach with the candidate when appropriate, to put him or her at ease
- Use questions or statements as prompts for keeping focused on the purpose of the questions and the kind of evidence being collected
- Use language at a suitable level for the candidate
- Listen carefully to the answers for opportunities to find unexpected evidence
- Follow up responses with further questions, if useful, to draw out more evidence or to make links between knowledge areas
- Compile a list of acceptable responses to ensure reliability of assessments

Recording responses

When using oral questioning, you may need a tool that has a structured approach (see below) and also enables you to record a candidate's responses. If the candidate's response is insufficient the assessor should record why on the recording sheet or checklist. This provides information that can be used later, if necessary, to explain to the candidate where he or she needs to develop their skills and/or knowledge to achieve the required competence.

Recording sheet for oral questioning (template)

Candidate's Name		
Assessor or Observer's Name		
Unit of Competency)		
Code		
Date of Assessment		
Location		
Task/Procedure		
Questions to be Answered by candidate	Response/Answer*	Satisfactory (Yes/No)
What would you do if …		
What would you do if …		
What would you do if …		
How do you …		
What are …		
Why did you… (Clarification)		
Follow up Questions		
The candidate's knowledge was:	Satisfactory Unsatisfactory	
Feedback to candidate:		
Candidate signature:	Date:	
Assessor/Observer's Signature:	Date:	

ASSESSOR GUIDE TO CONDUCTING COMPETENCY ASSESSMENTS

1. BEFORE THE ASSESSMENT	2. DAY OF ASSESSMENT	3. DURING THE ASSESSMENT	4. POST ASSESSMENT
- Review unit(s) of competency to be			

| assessed especially evidence to be collected against performance criteria

- Ensure the workplace or training center complies with all safety requirements and that high risk areas are clearly marked

- Identify/request essential assessment resources:
  • tools and equipment

  • supplies and materials

  • personal protective equipment

  • print resources and rating sheets

  • Have trainees contacted if they have to bring any resources for the assessment, e.g. logbook | -Verify attendance through signed attendance sheet

- Provide overview of what is to happen throughout day

Orient the trainees to:
• purpose of assessment

• qualification to be assessed

• assessment procedures to be followed

• address needs of trainees and provide information on evidence requirements and assessment process

• make all announcements just before start of assessment | Give clear instructions to trainees on what they are required to do:
• time limits and expectations

• all equipment and tools must be of the same quality for all trainees

• written and verbal instructions translated into local dialects as needed

• encourage questions

• avoid providing any assistance to trainees during assessment

• stop process if accident imminent

• keep focused on evidence being valid, reliable, fair, flexible, and safe

• Record details of evidence collected | Provide feedback on outcome of assessment process re:
• give clear feedback on assessment decision

• provide information on overcoming any gaps in competency assessment

• provide opportunity to discuss assessment process and outcome

Prepare required assessment reports:
• all rating sheets signed by trainee as well as Assessor

• maintain records of assessment procedures, evidence collected, and assessment outcome

• verify assessment results/outcomes with training center

Prepare

recommendations for issuance of national certificate |

Assessor's Quick Start

1. Identify the Unit(s) of Competency from the Program Standard that you are going to assess.

2. Review the Critical Aspects of Competency from the Unit of Competency that will be the basis of your Evidence Guide.

3. Select the Assessment Tools that you will use to gather evidence.
   i. Demonstration Checklist
   ii. Observation Checklist
   iii. Oral Questions Checklist

4. Create spec sheet(s) for the Unit of Competency to be examined.

5. Review the assessment procedure with the Candidate and ask if there are any questions.

6. Complete the assessment using the assessment tools in the order above. You are free to use other tools as well if you wish.

7. Determine whether Candidate is **Competent** or **Not-Yet-Competent**

8. Complete all necessary record sheets.

9. Give feedback to the Candidate.

Demonstration Checklist: Perform Pipe Threading Operation

Candidate's name:	
Assessor's name:	

Qualification:	Plumbing			
Project-Based Assessment Title				
Units of competency covered:	Perform Pipe Threading Operation			
Date of assessment:				
Time of assessment:				

Instructions for demonstration				
Please see attached Instruction for Demonstration (Candidate/Assessor)				

Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Measure and mark pipes in accordance with plumbing plan/drawing spec	☐	☐	☐
2. Clamp and fix steel pipes using pipe vice	☐	☐	☐
3. Cut pipes using appropriate cutting tool	☐	☐	☐
4. De-burr newly cut pipe from burr/sharp edges using appropriate de-burring tool	☐	☐	☐
5. Cut threads on pipes in accordance with workplace procedure	☐	☐	☐
6. Fix pipes and pipe fittings in accordance with planned/designed pipe run	☐	☐	☐
7. Measure/check assembled pipe runs within tolerable dimensions/length in accord with design/specification	☐	☐	☐
8. Clean workplace and dispose of waste materials in accordance with workplace requirement	☐	☐	☐
	☐	☐	☐

Observation Checklist: Perform Pipe Threading Operation

Candidate's name:	
Assessor's name:	
Date of Assessment:	

Unit of Competency:	Perform Pipe Threading Operation	
Code:	**SEIP-CON-PLU-1-0**	
Name of Workplace/Training Center		
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided	

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	**NO**
1. Show proven ability to measure and mark pipes		
2. Clamp and fix steel pipes using appropriate tool		
3. Cut pipes using appropriate cutting tool		
4. De-burr newly cut pipes using correct de-burring tool		
5. Cut pipe threads according to workplace procedure		
6. Fix pipes and fittings to meet planned pipe run		
7. Measure/check pipe runs to correct dimensions		
8. Maintain clean workplace and dispose of waste		
Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		
Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Perform Pipe Threading Operation

Candidate's name:	
Assessor's name:	

Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Perform Pipe Threading Operation
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	**YES**	**NO**
1. Why is it important to use the right kind of marker when marking pipes?		
2. What is the purpose of de-burring?		
3. How often should the assembled pipe run be measured/checked against the spec?		
4. When is it important to use coolants?		
5. What is a pipe run calculation method?		
6. How important are the attachment fittings?		
7. Is disposing of waste that necessary when time deadlines are so pressing?		
8. Why is appropriate personal protective equipment so important in plumbing tasks?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   Satisfactory/   Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/   Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

Demonstration Checklist: Perform Access Cutting And Encroachment Works

Candidate's name:	
Assessor's name:	
Qualification:	Plumbing
Project-Based Assessment Title	
Units of competency covered:	Perform Access Cutting And Encroachment Works
Date of assessment:	
Time of assessment:	

Instructions for demonstration
Please see attached Instruction for Demonstration (Candidate/Assessor)

Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Interpret drawing/plumbing plans	☐	☐	☐
2. Plan out possible solutions needed for obstructions on encroachment work	☐	☐	☐
3. Select, gather, and check tools, equipment, materials, and PPEs for usability	☐	☐	☐
4. Prepare layout for access/encroachment work	☐	☐	☐
5. Cut walls and floors without damage to walls, floors, or adjacent areas	☐	☐	☐
6. Clean used tools/equipment and dispose of waste materials according to workplace requirements	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Perform Access Cutting And Encroachment Works

Candidate's name:	

Assessor's name:	
Date of Assessment:	
Unit of Competency:	Perform Access Cutting And Encroachment Works
Code:	**SEIP-CON-PLU-2-0**
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1. Showed proven ability to interpret drawings/plans effectively.		
2. Inspected encroachment work area.		
3. Assembled proper tools, and materials for work.		
4. Cut access effectively through walls and/or floors.		
5. Cleaned work area and disposed of waste properly.		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		

Candidate's Signature:	Date:
Assessor's Signature:	Date:

Oral Questions Checklist: Perform Access Cutting And Encroachment Works

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Perform Access Cutting And Encroachment Works
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	**YES**	**NO**
1. What are some common methods used to cut concrete walls to create pipe access?		
2. Why are PPEs so important in work of this kind?		
3. How do you avoid damage to adjacent walls or floors when cutting?		
4. Why is it important to interpret building drawings competently?		
5. What problems can occur with encroachment work?		
6. Why is a proper laying out for access so important?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   Satisfactory/   Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/   Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

Demonstration Checklist: Carry Out Water Supply Line Installation Using G.I., PPR And HDPE Pipes

Candidate's name:	
Assessor's name:	
Qualification:	Plumbing
Project-Based Assessment Title	
Units of competency covered:	Carry Out Water Supply Line Installation Using G.I., PPR And HDP Pipes
Date of assessment:	
Time of assessment:	

Instructions for demonstration			
Please see attached Instruction for Demonstration (Candidate/Assessor)			

Supplies and Materials	Tools and equipment
▪ Please refer to attached specific instruction	• Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Given the spec/task, identify and gather appropriate pipes/cutting tools according to specified sizes.	☐	☐	☐
2. Cut G.I., PPR and HDP pipes to the specified dimension/tolerance.	☐	☐	☐
3. Carry out thread cutting on pipes according to workplace procedure.	☐	☐	☐
4. Position G.I., PPR and HDP pipe runs in corresponding areas as per plan.	☐	☐	☐
5. Tighten piping joints and fittings using proper tools and sealants.	☐	☐	☐
6. Install correct clamps/fixtures along pipe runs conforming to plan.	☐	☐	☐
7. Check for leaks, holes and non-conformance to plans and correct.	☐	☐	☐
8. Clean used tools and equipment and dispose of waste materials properly.	☐	☐	☐
	☐	☐	☐

Observation Checklist: Carry Out Water Supply Line Installation Using G.I., PPR and HDPE Pipes

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Carry Out Water Supply Line Installation Using G.I., PPR And HDP Pipes
Code:	**SEIP-CON-PLU-3-0**
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec-if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	**NO**
1. Show proven ability to measure and mark pipes		
2. Cut the pipes to specified tolerance		
3. Show good positioning of pipes as per plan		
4. Tighten and seal joints/fittings properly		
5. Show good installation of fixtures along pipe runs		
6. Visibly check and correct leaks/holes as per plan		
7. Show evidence of maintaining the workplace properly		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		

Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Carry Out Water Supply Line Installation Using G.I., PPR and HDPE Pipes

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Carry Out Water Supply Line Installation Using G.I., PPR And HDP Pipes
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	**YES**	**NO**
1. Why is it important to use the right kind of marker when marking pipes?		
2. Why is it important to maintain cutting tools on an ongoing basis?		
3. What would happen if coolants were not used during thread cutting?		
4. How do you fill an oversized hole or opening?		
5. What could happen if waste materials were not disposed of?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   Satisfactory/   Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/   Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

Demonstration Checklist: Carry Out Water Supply Line Installation Using PVC/UPVC Pipes

Candidate's name:	
Assessor's name:	
Qualification:	Plumbing
Project-Based Assessment Title	
Units of competency covered:	Carry Out Water Supply Line Installation Using PVC/UPVC Pipes
Date of assessment:	
Time of assessment:	

Instructions for demonstration			
Please see attached Instruction for Demonstration (Candidate/Assessor)			

Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Clamped and cut PVC/UPVC Pipes using appropriate clamping device and cutting tool	☐	☐	☐
2. Measured and cut pipes ensuring specified dimension and tolerance	☐	☐	☐
3. Positioned PVC /UPVC Pipes runs on correct location as per plumbing plan	☐	☐	☐
4. Assembled PVC /UPVC Pipes joints and fittings using correct tools and sealant	☐	☐	☐
5. Ensured proper cooling time for sealant to bond after assembly of pipe joints and fittings	☐	☐	☐
6. Installed pipe clamps and fixtures on pipe runs in accord with plumbing plan	☐	☐	☐
7. Checked and corrected leaks and non-conformance to plumbing design/plans	☐	☐	☐
8. Filled holes and openings with cement plasters and finishing	☐	☐	☐
	☐	☐	☐

Observation Checklist: Carry Out Water Supply Line Installation Using PVC/UPVC Pipes

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Carry Out Water Supply Line Installation Using PVC/UPVC Pipes
Code:	**SEIP-CON-PLU-4-0**
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec-if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	**NO**
1. Showed proper clamping and cutting of PVC/UPVC pipes using proper tools		
2. Observed correct dimensions/tolerance in measuring and cutting pipes		
3. Followed plan in positioning PVC/UPVC pipe runs		
4. Showed proper technique in assembling PVC/UPVC piping joints/fittings using proper tools		
5. Observed proper cooling time for bonding of sealants		
6. Installed pipe clamps and fixtures on pipe runs as per plan		
7. Checked and corrected leaks and non-conformances as per plan		
8. Filled holes and openings with proper cement plasters and finishing		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		

Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Carry Out Water Supply Line Installation Using PVC/UPVC Pipes

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Carry Out Water Supply Line Installation Using PVC/UPVC Pipes
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	**YES**	**NO**
1. What would happen if sealants were not used on joints/fittings?		
2. How important is it to be able to interpret specs and plumbing designs and plans?		
3. Why is it important to keep an inventory of tools and equipment?		
4. How important are thread sealing techniques?		
5. Is a commitment to health and safety really that important?		
6. What is involved in proper finishing?		
7. What methods do you use to correct leaks?		
8. What technique can you recommend to fill holes and openings?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   Satisfactory/   Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/   Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

Demonstration Checklist: Carry Out Sewer Pipe Line Installation

Candidate's name:	
Assessor's name:	
Qualification:	Plumbing
Project-Based Assessment Title	
Units of competency covered:	Carry Out Sewer Pipe Line Installation
Date of assessment:	
Time of assessment:	

Instructions for demonstration
Please see attached Instruction for Demonstration (Candidate/Assessor)

Supplies and Materials	Tools and equipment
▪ Please refer to attached specific instruction	• Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Determine pipe run elevation and slope/pitch in accordance with plumbing plans/specification and result of site visit	☐	☐	☐
2. Lay out the size of trench/excavation in accordance with workplace and plumbing plan requirement	☐	☐	☐
3. Apply grade/slope of trench in accordance with workplace and plumbing plan requirement	☐	☐	☐
4. Lay bedding material in accordance to workplace and plumbing plan requirement	☐	☐	☐
5. Lay sewer pipes on the trench in accordance with workplace and plumbing plan requirements	☐	☐	☐
6. Install PVC Sewer pipes by using appropriate sealing/glueing materials	☐	☐	☐
7. Check alignment and pipe elevation in accordance to workplace and plumbing plan requirement	☐	☐	☐
8. Install fittings to complete the final run of the sewer pipe installation	☐	☐	☐
9. Check final pipe run for leaks and non-conformance to workplace and plumbing plan requirements	☐	☐	☐
10. Lay covering materials on top of the sewer pipe run in accordance with workplace and plumbing plan requirement	☐	☐	☐

Observation Checklist: Carry Out Sewer Pipe Line Installation

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Carry Out Sewer Pipe Line Installation
Code:	**SEIP-CON-PLU-5-0**
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1. Show proven ability to determine pipe run elevation.		
2. Observe all essential health and safety practices.		
3. Lay bedding material appropriately.		
4. Install PVC pipes using proper sealing materials.		
5. Show ability to check alignment and pipe elevation.		
6. Install fittings to complete the final run.		
7. Check pipe for non-conformance to requirements.		
8. Lay appropriate covering material.		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		

Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Carry Out Sewer Pipe Line Installation

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Carry Out Sewer Pipe Line Installation
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	

Indicate Y or N in the box provided	YES	NO
1. Why is it important to make a sit visit prior to commencing work?		
2. Why is bedding material important?		
3. What methods are used for determining grade/slope of trench?		
4. What are some of the most common covering materials?		
5. Why is it important to check the final pipe run?		
6. What are important things to remember when installing pipe fittings?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   Satisfactory/   Not Satisfactory

The Candidate's underpinning knowledge was (circle): Satisfactory/   Not Satisfactory

Assessor Signature:	Date:
Candidate Signature:	Date:

Demonstration Checklist: Carry Out Plumbing Fixtures Installation

Candidate's name:	
Assessor's name:	
Qualification:	Plumbing
Project-Based Assessment Title	
Units of competency covered:	Carry Out Plumbing Fixtures Installation
Date of assessment:	
Time of assessment:	

Instructions for demonstration			
Please see attached Instruction for Demonstration (Candidate/Assessor)			

Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Gather plumbing fixtures at the work site.	☐	☐	☐
2. Install toilet bowl flange securely making sure the bolts are in place.	☐	☐	☐
3. Place new toilet bowl on the flange aligning the bolt-holes with bolts of flange, ensuring wax ring set properly.	☐	☐	☐
4. Tighten the nuts with washers squarely without over-tightening.	☐	☐	☐
5. Install the water closet tank on bowl in accord with manufacturer's instruction.	☐	☐	☐
6. Install other fixtures in accord with plan and manufacturer's instruction.	☐	☐	☐
7. Check newly installed fixtures for leaks and non-conformance with workplace requirements.	☐	☐	☐
8. Carry out reworks/adjustment in accord with workplace requirements.	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Carry Out Plumbing Fixtures Installation

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Carry Out Plumbing Fixtures Installation
Code:	**SEIP-CON-PLU-6-0**
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec-if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1. Show proven ability to install toilet bowl flange securely		
2. Position toilet bowl on flange aligning all bolt/ring		
3. Tighten nuts squarely without over-tightening		
4. Install water closet tank on bowl as per instruction		
5. Install other fixtures in accord with plumbing plan		
6. Observed trainee checking fixtures for leaks		
7. Carry out adjustments in accord with requirements		

Candidate's performance was:	COMPETENT	NOT YET COMPETENT
Feedback to Candidate:		

Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Carry Out Plumbing Fixtures Installation

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Carry Out Plumbing Fixtures Installation
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	**YES**	**NO**
1. Why is it important to read manufacturer's instructions prior to fixture installation?		
2. Of what importance is sealing material around the base of the toilet bowl?		
3. How important are tightening techniques for toilet bowls?		
4. How do you go about testing for leaks?		
5. What are some of the more common problems that can occur besides leaks?		
6. What environmental concerns are associated with this type of work?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   Satisfactory/   Not Satisfactory

The Candidate's underpinning knowledge was (circle):   Satisfactory/   Not Satisfactory

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**

Demonstration Checklist: Perform Pressure Testing Of Piping System

Candidate's name:	
Assessor's name:	
Qualification:	Plumbing
Project-Based Assessment Title	
Units of competency covered:	Perform Pressure Testing Of Piping System
Date of assessment:	
Time of assessment:	

Instructions for demonstration
Please see attached Instruction for Demonstration (Candidate/Assessor)

Supplies and Materials ▪ Please refer to attached specific instruction	Tools and equipment • Please refer to attached specific instruction

	✓ to show if evidence is demonstrated		
During the demonstration of skills, did the candidate:	Yes	No	N/A
1. Determine maximum test pressure in accordance with plumbing plan/design specification	☐	☐	☐
2. Identify pressure testing method in accordance with plumbing plan/workplace requirements	☐	☐	☐
3. Check Pressure testing tools, equipment and materials for usability/accuracy	☐	☐	☐
4. Apply preliminary, intermediate and final test pressures progressively into the system in accordance with workplace pressure testing plan/procedure	☐	☐	☐
5. Apply appropriate leak testing method for each intermediate pressure to determine presence of leaks.	☐	☐	☐
6. Report leak testing result to Assessor	☐	☐	☐
7. Record test results in accordance with workplace requirements	☐	☐	☐
8. Observe safety precautions when performing pressure testing record test results in accordance with workplace requirements	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

Observation Checklist: Perform Pressure Testing Of Piping System

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Unit of Competency:	Perform Pressure Testing Of Piping System
Code:	**SEIP-CON-PLU-7-0**
Name of Workplace/Training Center	
Procedure to Follow:	Observe Candidate's performing the task, and following the spec- if a spec is provided

During the demonstration of skills, did the Candidate do the following (List steps that reflect critical aspects of competency from performance criteria of Unit of Competency):

	YES	NO
1. Determine maximum test pressure in accordance with plumbing plan/design specification		
2. Identify pressure testing method in accordance with plumbing plan/workplace requirements		
3. Check Pressure testing tools, equipment and materials for usability/accuracy		
4. Apply preliminary, intermediate and final test pressures progressively into the system in accordance with workplace pressure testing plan/procedure		
5. Apply appropriate leak testing method for each type of pressure to determine presence of leaks.		
6. Report leak testing result to Assessor		
7. Record test results in accordance with workplace requirements		

Candidate's performance was:	**COMPETENT**	**NOT YET COMPETENT**
Feedback to Candidate:		

Candidate's Signature:		Date:
Assessor's Signature:		Date:

Oral Questions Checklist: Perform Pressure Testing Of Piping System

Candidate's name:	
Assessor's name:	
Date of Assessment:	
Assessment Venue:	
Unit of Competency:	Perform Pressure Testing Of Piping System
Reference Standard:	Plumbing

The List of Questions below must be pegged to the competency demonstration test and may involve related specs for each Unit of Competency tested. Underpinning skills for Knowledge may also be reviewed for Competent/Not Yet Competent designation.

List of Questions	Satisfactory Response	
Indicate Y or N in the box provided	**YES**	**NO**
1. Why is it important to carry out progressive pressure testing through preliminary, intermediate, and final test pressures into the piping system?		
2. How often should pressure testing tools, equipment, and materials be checked for usability and accuracy?		
3. Why is it important to record test results?		
4. What safety precautions should be observed when performing pressure testing?		

Feedback to Candidate:

The Candidate's overall performance was (circle):   **Satisfactory/**   **Not Satisfactory**

The Candidate's underpinning knowledge was (circle):   **Satisfactory/**   **Not Satisfactory**

Assessor Signature:	**Date:**
Candidate Signature:	**Date:**