STANDARD KEMAHIRAN PEKERJAAN KEBANGSAAN
(NATIONAL OCCUPATIONAL SKILLS STANDARD)

F432-002-2:2017

PLUMBING AND SANITARY INSTALLATION OPERATION

LEVEL 2

JPK

JABATAN PEMBANGUNAN KEMAHIRAN
KEMENTERIAN SUMBER MANUSIA, MALAYSIA

Department of Skills Development (DSD)
Federal Government Administrative Centre
62530 PUTRAJAYA, MALAYSIA

NATIONAL OCCUPATIONAL SKILLS STANDARD

PLUMBING AND SANITARY INSTALLATION OPERATION
LEVEL 2

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ABBREVIATION

CoCU	Curriculum of Competency Unit
CP	Competency Profile
CPC	Competency Profile Chart
CU	Competency Unit
CAPEX	Capital Expenditure
DKM	*Diploma Kemahiran Malaysia*
DLKM	*Diploma Lanjutan Kemahiran Malaysia*
DSD	Department of Skills Development
FAVAD	Fixed and Variable Area Discharges
GIS	Geographical Information System
IWA	International Water Association
JPK	*Jabatan Pembangunan Kemahiran*
JTPS	*Jawatankuasa Teknikal Penilaian Standard*
KPI	Key Performance Indicator
KETTHA	Ministry of Energy, Green Technology and Water
LNF	Legitimate night flow
MNF	Minimum Night Flow
NRW	Non-Revenue Water
NNF	Net Night Flow
NOSS	National Occupational Skills Standard
OPEX	Operational Expenditure
OSHA	Occupational Safety and Health Administration

OS	Occupational Structure
OAS	Occupational Area Structure
PPE	Personal Protective Equipment
SHE	Safety, Health Environmental
SOP	Standard Operating Procedure
SPAN	*Suruhanjaya Perkhidmatan Air Negara*
SKM	*Sijil Kemahiran Malaysia*
SP	Standard Practice
SPM	*Sijil Pelajaran Malaysia*
UTG	Uniformed Technical Guidelines

STANDARD PRACTICE

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR;

PLUMBING AND SANITARY INSTALLATION OPERATION

LEVEL 2

1. INTRODUCTION

Two main laws passed in 2006 form the legal framework of the water and sanitation sector in peninsular Malaysia. Water Service Industry Act (WSIA) 2006 an act to provide for and regulate water supply services and sewerage services in Malaysia. The National Water Services Commission Act established a National Water Services Commission known under its Malay acronym as SPAN which issues licenses for water operators, mainly state water companies. These licenses can theoretically be revoked if key performance indicators are not met or other standards are not respected. As for plumbing works, SPAN issues plumbing licence or permit A1 and A2 for qualified plumbers.

A plumber will begin working for a plumbing service company or water supply provider and then perhaps start up their own business later, A plumber has to be someone happy working with their hands. A good plumber will be agile and fit and not mind getting their hands dirty. Working in cramped and sometimes risky conditions is quite likely, so a plumber needs to feel confident that they can manage any sort of environment.

A plumbing and sanitary installation operation personnel main job functions are in installing, repairing and maintaining pipe, sanitary appliances and fixtures use in the piping system in a house or building premises. The main job areas are in the plumbing and sanitary drawing, plumbing and sanitary works preparation, water pipe installation, waste pipe installation, water tank installation and also plumbing and sanitary maintenance works. The personnel also need needs to know how to prepare drawings and understand all the symbols and legend, and figures to understand the layout of water supply, waste, and piping systems for a given job scope. The personnel also need to do testing and reports writing after completing a given job and comply with standards and regulations.

1.1 Justification of NOSS Development and Level Shrinking

This is a review NOSS for Plumbing and Sanitary Installation Operations. Based on discussion among the industry experts, Level 1 is regarded as fitters. By considering the work condition and situation, personnel of Level 1 scope of work is merely assisting personnel of Level 2 namely junior technician in performing the core work processes.

In reference to industry practice, the plumbing and sanitary installation operation is done in a group consisting of Level 2 and 3. For Level 2, it is the continuity of work cycle from Level 1 and 2 in which each level complementing the work of others. As for Level 3 personnel of this level has different competencies with Level 2 and the scope of work has competitive units. Therefore, panel of experts came with a consensus that in skills training it is best to shrink the levels into 2 tier entry at level 2.

2. OCCUPATIONAL STRUCTURE (OS)

SECTOR	**Construction (F)**		
SUB-SECTOR	**Electrical, Plumbing and Other Construction Installation Activities (43)**		
AREA	**Installation of Plumbing and Sanitary Equipment**		
	Sewerage	Plumbing and Sanitary	Water Reticulation
LEVEL 5	Water Services Manager		
LEVEL 4	Water Services Executive		
LEVEL 3	Supervisor/ Senior Technician	Supervisor/ Senior Technician	Supervisor/ Senior Technician
LEVEL 2	Technician	Technician	Technician
LEVEL 1	Fitter	Fitter	Fitter

Figure 1.2: Occupational Structure for Plumbing and Sanitary Installation Operation

3. OCCUPATIONAL AREA STRUCTURE (OAS)

SECTOR	**Construction (F)**		
SUB-SECTOR	**Electrical, Plumbing and Other Construction Installation Activities (43)**		
AREA	**Installation of Plumbing and Sanitary Equipment**		
	Sewerage	Plumbing and Sanitary	Water Reticulation
LEVEL 5	Water Services Management		
LEVEL 4	Water Services Administration		
LEVEL 3	Supervisor/ Senior Technician	Plumbing and Sanitary Installation Supervision	Supervisor/ Senior Technician
LEVEL 2	Technician	Plumbing and Sanitary Installation Operation	Technician
Level 1	Fitter	Embedded	Fitter

Figure 1.3: Occupational Area Structure for Plumbing and Sanitary Installation Operation

Justification for Level 1 being embedded to Level 2 due to insufficient competency unit (CU) for Level 1for SKM certification purpose and industrial employability requirement

4. DEFINITION OF COMPETENCY LEVELS

The NOSS is developed for various occupational areas. Candidates for certification must be assessed and trained at certain levels to substantiate competencies. Below is a guideline of each NOSS Level as defined by the Department of Skills Development, Ministry of Human Resources, Malaysia.

Level 1: Competent in performing a range of varied work activities, most of which are routine and predictable.

Level 2: Competent in performing a significant range of varied work activities, performed in a variety of contexts. Some of the activities are non-routine and required individual responsibility and autonomy.

Level 3: Competent in performing a broad range of varied work activities, performed in a variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.

Level 4: Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.

Level 5: Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources features strongly, as do personal accountabilities for analysis, diagnosis, planning, execution and evaluation.

5. AWARD OF CERTIFICATE

The Director General shall award, to any person upon completing successfully the NOSS program following skills level qualifications as stipulated under the National Skills Development Act, 652:

- Malaysia Skills Certificate / *Sijil Kemahiran Malaysia* (SKM) Level 2
- Statement of Achievement / *Penyata Pencapaian* (PC)

6. JOB COMPETENCIES

The Plumbing and Sanitary Installation Operation personnel is competent in performing the following core competencies :-

a. Plumbing and Sanitary Technical Drawing Preparation
b. Plumbing and Sanitary Works Preparation
c. Water Pipe Installation
d. Waste Pipe Installation
e. Water Tank Installation
f. Plumbing and Sanitary Maintenance Works

7. WORK CONDITIONS

The working conditions can vary from job to job and with differing levels of experience and qualifications, but as a rule the vast majority of conditions will be within another person's private environment. This might take the form of a domestic home or it could be within a public area such as a school, shop or hospital

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The one thing that's consistent though is that a plumber will be expected to appear presentable and not intimidating. A plumber will be on the move all the time and won't be tied to the same space, like in an office job. Good plumbers need to like moving around and adapting to new and challenging working environments all the time.

Plumbers need to have a good knowledge of the water regulations and building regulations too in order for them to carry out their job effectively

8. EMPLOYMENT PROSPECTS

There are excellent prospect in private sectors due to shortage of hands-on expert in plumbing and sanitary installation operation. L2 Personnel trained under this training program is eligible to be employed in water suppliers and service providers, installation contractors or training providers. This area has a very good job market potential due to shortage of such highly skilled personnel in Malaysia.

Employment opportunities in Malaysia are as follows

- Water Service Providers such as SYABAS, Lembaga Air Perak (LAP), Syarikat Air Johor (SAJ)
- Plumbing and Water Reticulation Contractors
- Sanitary ware installation companies
- Trainer or Plumbing Instructor such as Akademi Binaan Malaysia, SYABAS, LAP and SAJ
- Professional Plumber

9. CAREER ADVANCEMENT

The career path in plumbing depend on the type and size of a particular organization. In general, there will be more career development opportunities with larger employer. There is no professional or specialization training advancement in this plumbing work Level 2 and Level 3 but they can further their study to L4 (*Diploma Kemahiran Malaysia*) and L5 (*Diploma Lanjutan Kemahiran Malaysia*)

10. SOURCES OF ADDITIONAL INFORMATION

The following organisations can be referred as sources of additional information which can assist in defining the document's contents.

a. Suruhanjaya Perkhidmaan Air Negara (SPAN)
   Aras Bawah dan Aras Satu,
   Prima Avenue 7, Blok 3510,
   Jalan teknokrat 6,
   6300 Cyberjaya, Selangor
   Tel : 03-83179333
   Fax : 03- 83179336
   Email: span@span.gov.my

b. Kementerian Kesejahteraan Bandar, Perumahan dan KerajaanTempatan
No.51, Persiaran Perdana,
PERSINT 4,
62100, Putrajaya.
Tel: 03-8000 8000
Fax : 03-88915557

c. Lembaga Pembangunan Industri Pembinaan Malaysia
Tingkat 10, No 45, Menara Dato' Onn,
Pusat Dagangan Dunia Putra,
JalanTun Ismail
50480 Kuala Lumpur
Tel: 03-40477000
Fax 03 4047 7070
email: cidb@cidb.gov.my

d. Jabatan Bomba dan Penyelamat Malaysia
Lebuh Wawasan, Presint 7, 62250 Putrajaya
Telephone: 03-8888 0036/37/38/40
Fax: 03-8888 0025
Website: http://www.bomba.gov.my

11. ACKNOWLEDGEMENT

The Director General of DSD would like to extend his gratitude to the organization and individuals who have been involved in developing this standard; especially the members of Standard Technical Evaluation Committee (STEC) for validation of this document

STANDARD TECHNICAL EVALUATION COMMITTEE (STEC)		
1.	En Thomas A/L Joseph Thomas	Director Suruhanjaya Perkhidmatan Air Negara (SPAN)
2.	En Izaidi bin Ahmad	Deputy Director Suruhanjaya Perkhidmatan Air Negara (SPAN)
3.	En Anizam Bin Shamsuddin	Assistant Manager Syarikat Bekalan Air Selangor (SYABAS)
4.	Ir Ishak Bin Hasnan	Director Lembaga Air Perak (LAP)

12. **NOSS DEVELOPMENT COMMITTEE MEMBERS**

PLUMBING AND SANITARY INSTALLATION OPERATION

LEVEL 2

STANDARD DEVELOPMENT COMMITTEE (SDC)		
1.	MAT RODZI BIN ABDUL RAOF	INSTRUCTOR PLUMBING AKADEMI BINAAN MALAYSIA WILAYAH TIMUR
2.	MAHAINDRAN A/L KRISTNAN	JURUTERA KANAN JABATAN KERJA RAYA MALAYSIA
3.	MOKHTAR BIN ATAN	PENGURUS KANAN SYARIKAT BEKALAN AIR SELANGOR SDN BHD
4.	ZAINUDDIN BIN TAIB	JURUTERA OPERASI LEMBAGA AIR PERAK
5.	ZULKIFLY BIN AHMAD	JURUTEKNIK KANAN PERBADANAN BEKALAN AIR PULAU PINANG SDN BHD
6.	MOHD AB.DUH BIN MOHD JAAFAR	PENGAJAR JURUREKA PAIP INSTITUT KEMAHIRAN BELIA NEGARA WAKAF TAPAI
7.	MAHMOD KHAIRI BIN SHAHMIN	PENGURUS OPERASI PANTAS TERAJU SDN BHD
8.	ISA BIN HJ ABU BAKAR	PENGARAH SAJ HOLDINGS SDN BHD JOHOR BARU
9.	KHITHOB BIN AHMAD	TIMBALAN PENGARAH SURUHANJAYA PERKHIDMATAN AIR NEGARA (SPAN)
FACILITATOR		
1.	SAIFUL ANWAR BIN ABU HASAN	FACILITATOR EDUSURE SDN BHD

STANDARD CONTENT

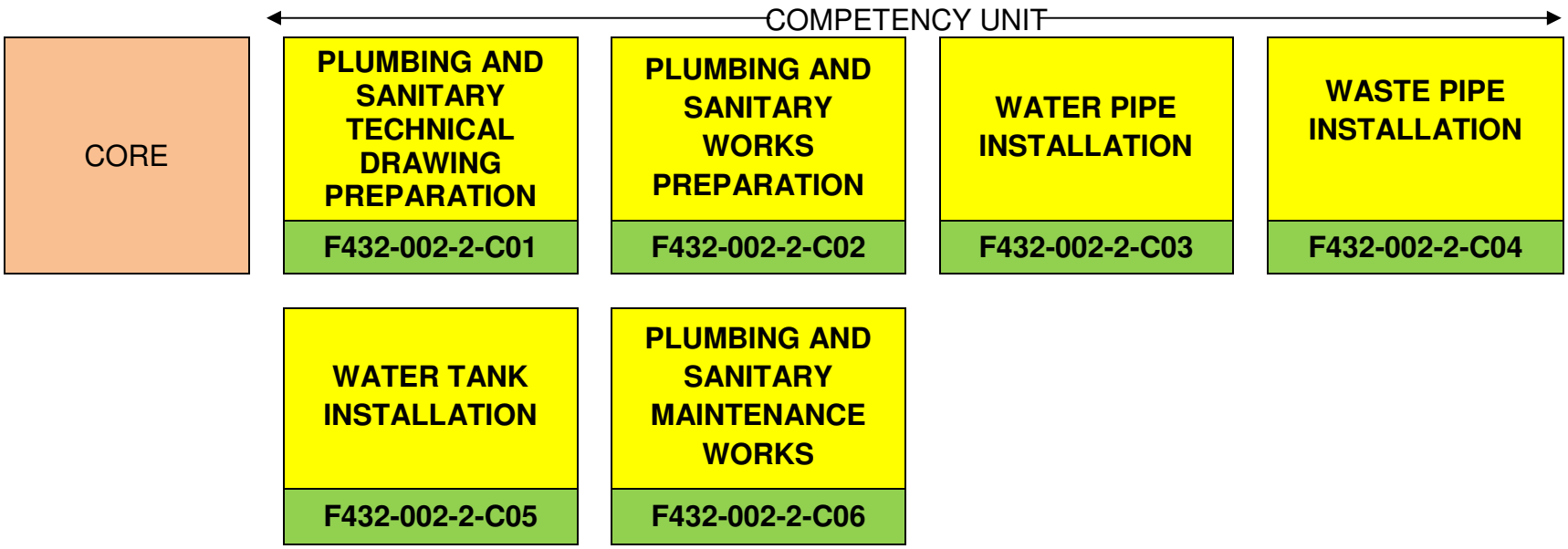
NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR;

PLUMBING AND SANITARY INSTALLATION OPERATION

LEVEL 2

COMPETENCY PROFILE CHART (CPC)

SECTOR	**CONSTRUCTION (F)**		
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**		
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**		
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**		
JOB LEVEL	**TWO (2)**	**NOSS CODE**	**F432-002-2:2017**



COMPETENCY PROFILE (CP)

SECTOR	**CONSTRUCTION (F)**		
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**		
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT (43224)**		
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**		
JOB LEVEL	**LEVEL 2**	**NOSS CODE**	**F432-002-2:2017**

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
1. Plumbing and Sanitary Technical Drawing Preparation	F432-002-2: 2017 C01	Plumbing and sanitary technical drawing preparation involves in producing technical drawing that display the symbol and legend on the layout. It could be produced manually by using drawing tools or by computer added design (CAD) application A competent person in this CU shall be able to Prepare Plumbing Drawing, Prepare Sanitary Drawing, Prepare Waste Pipe	1. Prepare plumbing drawing	1.1 Required drawing tools and material checked for good condition according to drawing requirement 1.2 Correct symbol and legend for valve, pipe and fitting determined from standard plumbing plan. 1.3 Technical drawing for plumbing prepared with accurate dimension, symbols and legends according to plumbing work requirement 1.4 Complete plumbing

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		Drawing, Prepare Construction Drawings, Compile Plumbing and Sanitary Drawing systematically for record purpose. Plumbing and sanitary works drawing normally come with isometric, schematic and diagrammatic illustrations The outcome of this competency is to ensure that all drawings must be produced prior to work commencement and are prepared according to Regulatory Body's guidelines and Uniform Building By Law (UBBL) guidelines		drawing prepared according to regulatory body requirement 1.5 Plumbing drawing with isometric, schematic and diagrammatic illustrations timely submitted to superior for review
			2. Prepare sanitary drawing	2.1 Suitable drawing tools and material checked for good condition according to drawing requirement 2.2 Correct symbol and legend for pipe, fitting and fixtures determined from standard plan 2.3 Technical drawing for sanitary works prepared with accurate dimensions, symbols and legends according to sanitary work requirement 2.4 Complete sanitary drawing prepared according to regulatory body requirement 2.5Sanitary drawing with

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				isometric, schematic and diagrammatic illustrations timely submitted to superior for review
			3. Prepare waste pipe drawing	3.1 Suitable drawing tools and material selected and checked for good condition according to drawing requirement 3.2 Correct symbol and legend for valve, pipe and fitting determined from standard plumbing plan. 3.3 Technical drawing for waste pipe prepared with accurate dimensions, symbols and legends according to plumbing work requirement 3.4 Complete waste pipe drawing prepared according to regulatory body requirement 3.5 Waste pipe drawing with isometric, schematic and diagrammatic

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				illustrations timely submitted to superior for review
			4. Prepare construction drawings	4.1 Site plan interpreted to determine exact site location 4.2 Pipe line position and piping system configuration determined as per layout plan 4.3 Pipe position and specification is drawn on the detailed plan according to standard construction drawing requirements 4.4 Complete construction drawing timely submitted to superior.
			5. Compile plumbing and sanitary drawings	5.1 Drawings are checked for project title, date and work location as per drawing standard format 5.2 Drawings are sorted according to type, sizes and scope of work 5.3 Drawings are

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				systematically compiled according to project title, plan, details and scope of work for verification and record keeping
2. Plumbing and Sanitary Works Preparation	F432-002-2: 2017 C02	Plumbing and Sanitary Works Preparation describes the competency in selecting correct materials, tools and equipment to be used in a specific working condition A competent person in this CU shall be able to determine work position and location, prepare water pipe tools and equipment, prepare	1. Determine work position and location	1.1 Position and location of plumbing work determined from approved construction drawing 1.2 Pipe route point checked from construction drawing to ensure correct pipe alignment 1.3 Correct marking tools are determined based on work requirement and location type.

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		waste pipe tools and equipment, request for required material, prepare material storage and maintain tool and equipment The outcome of this competency is to ensure that all works are in compliance with Water Service Industry Act (WSIA) and related regulation, Uniform Technical Guideline (UTG), Uniform Building By Law (UBBL) and Occupational Safety And Health Act (OSHA) requirement	2. Prepare water pipe tools and equipment	2.1 Construction drawing interpreted for choosing types of tool, material and equipment required 2.2 Water pipe tool and equipment for trenching, cutting, jointing and testing selected for quality of work and suit with site condition and meet standard specification 2.3 Water pipe tool and equipment condition checked according to manufacturer's manual and scope of work 2.4 Water pipe tool and equipment tested for functionality and performance according work instruction and manufacturer specification 2.5 Water pipe tool and equipment timely arranged to work location and safely kept

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			3. Prepare waste pipe tool and equipment	3.1 Construction drawing interpreted for choosing types of tool and equipment required 3.2 Waste pipe tool and equipment for trenching, cutting, jointing and testing selected for quality of work and suit with site condition and meet standard specification 3.3 Waste pipe tool and equipment condition checked according to manufacturer's manual and scope of work 3.4 Waste pipe tool and equipment tested for functionality and performance according work instruction and manufacturer's manual 3.5 Waste pipe tool and equipment timely arranged to work location and safely kept
			4. Request piping material	4.1 Quantity, size, grade, type and standard specification of

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				material determined based on construction drawing and Bill of Quantities (BQ) 4.2 Accurate material quantity, size, grade, type and standard specification are timely submitted for requisition 4.3 Received materials checked for correct quantity, quality, size, grade, type and standard as per requisition specification 4.4 Defective material rejected base on non-compliance of grade, class, type, standard and technical specification as per requisition
			5. Carry out material storage	5.1 Material storage location, area and safety determined according to work site condition 5.2 Hazardous material

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				stored in dry ventilated area as per Material Safety Data Sheet (MSDS) requirement 5.3 Material stored for accessibility, safety, mobilization and efficient acquisition according to storage procedure 5.4 Material stored with proper material turn over and stock control record according to inventory control procedure
			6. Carry out tools and equipment storage	6.1 Tool and equipment cleaned from dirt/grease and checked for functionality to ensure quality of work 6.2 Equipment are well maintained as per preventive maintenance schedule 6.3 Defective tools and equipment identified for repair or part replacement according to manufacturer`s

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				manual 6.4 Tools and equipment are stored at designated area according to good housekeeping and safety practices 6.5 Inventory record systematically filed according to standard filing system
3. Water Pipe Installation	F432-002-2: 2017 C03	Water pipe installation describes the competency in performing pipe and fitting installation including trenching, bedding and hacking brick wall prior to laying of pipe and fixing components A competent person in this CU shall be able to interpret work instruction, determine water pipe installation requirement, select pipe material,	1. Interpret work instruction	1.1 Work instruction interpreted to determine scope of work for water pipe installation 1.2 Construction drawing interpreted for accurate work location 1.3 Work instruction interpreted for installation schedule details information
			2. Determine water pipe installation requirement	2.1 Type of materials, fitting, jointing material and valve required are determined from water

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		The outcome of this competency is to ensure that all works are in compliance with Occupational Safety And Health Act (OSHA) requirement Water Service Industry Act (WSIA) and related regulation Uniform Technical Guideline (UTG) and Uniform Building By Law (UBBL)		pipe installation drawing 2.2 Hot or cold water pipe system determined as per approved installation drawing 2.3 Quantity and specification of water pipe materials required determined from water pipe installation drawing
			3. Select pipe material	3.1 Cold or hot piping system confirmed from approved installation drawing 3.2 Type of pipe material determined as per technical specification (dimension, pressure rating and ground condition) 3.3 Suitable type of pipe material selected based on concealed or exposed piping installation, site condition and technical specification

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			4. Perform water pipe setting out	4.1 Water pipe lay-out determined from construction drawing 4.2 Marking tools and equipment selected and tested for good condition and functionality 4.3 Water pipe setting clearly marked according to water pipe lay-out 4.5 Water pipe properly aligned by horizontally or vertically according to pipe setting marking
			5. Perform water pipe and fitting installation	5.1 Required PPE properly worn according to Occupational Safety and Health Act (OSHA) requirement 5.2 Trenching work is carried out with required depth and width as per drawing specification 5.3 Bedding work is carried out with proper levelling and required material as per drawing specification

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				5.4 Cutting and hacking of brick wall carried out with required depth and width as per drawing specification 5.5 Water pipe and fitting are properly laid and fixed according to approved detail installation drawing 5.6 Water pipe is securely fixed with correct type and dimension of jointing materials as per drawing specification 5.7 Water pipe fitting levelling and finishing visually checked as per industrial practice quality and free from leakage 5.8 Manpower working at site complied with safety rules and regulation to avoid injuries, instrument damage and pollution according to safety, health and environmental. 5.9 Work area, tools

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				and equipment cleaned from dirt and properly kept according to housekeeping and safety practices
			6. Carry out water pipe pressure test	6.1 Construction drawing is interpreted to determine class, type, size, diameter and length of water pipe 6.2 Work instruction interpreted to determine scope of work and pressure testing method 6.3 Source of water connected to the pipe to be tested with leakage free 6.4 Pressure testing instrument properly set to water pipe for pipelines pressure testing. 6.5 Pressure reading of water pipe checked equivalent with main source pressure 6.6 Pressure test results are accurately recorded in standard form

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				6.7 Work area, tool and equipment cleaned from dirt and properly kept according to housekeeping and safety practices
			7. Carry out water pipe leakage test	7.1 Construction drawing is interpreted to determine size, diameter and length of water pipe 7.2 Work instruction interpreted to determine scope of work and leakage testing method 7.3 Source of water connected to the pipe to be tested free from leakage 7.4 Pipe fitting visually checked free from leakage and sign of leak 7.5 Leakage test results are accurately recorded in standard form 7.6 Suitable backfilling material placed with sufficient

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				compactness, levelling and good housekeeping as per backfilling work practices 7.7 Work area are cleaned from dirt according to housekeeping and safety practices
			8. Prepare pipe installation and test reports	8.1 Water pipe installation report prepared with accurate information according to report format 8.2 Water pipe fitting installation report prepared with accurate information according to report format 8.3 Pipe test report prepared with accurate information according to report format 8.4 All reports are systematically compiled and timely submitted to superior
4. Waste Pipe Installation	F432-002-2: 2017 C04	Waste pipe installation describes the	1. Interpret work instruction	1.1 Construction drawing interpreted for

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		competency in performing pipe and fitting installation including trenching, bedding and coring of brick wall prior to laying of pipe and fixing components A competent person in this CU shall be able to interpret work instruction, determine waste pipe installation requirement, select pipe material, perform waste pipe setting out, perform waste pipe and fitting installation, perform sanitary pipe and fitting installation, perform sanitary appliances installation, perform waste trap installation, carry out waste pipe test and compiling reports The outcome of this competency is to ensure that all works are in compliance with		accurate work location 1.2 Work instruction interpreted to determine scope of work for waste pipe installation 1.3 Waste pipe installation schedule determined as per work instruction requirement
			2. Determine waste pipe installation requirement	2.1 Type of materials, fitting, jointing material and valve required are determined from waste pipe installation drawing 2.2 Hot or cold water pipe system determined as per approved installation drawing 2.3 Quantity and specification of required materials determined from waste pipe installation drawing
			3. Select pipe material	3.1 Correct type of piping system confirmed from approved installation

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		Occupational Safety and Health Act (OSHA) requirement Uniform Technical Guideline (UTG) and Uniform Building By Law (UBBL)		drawing 3.2 Type of waste pipe material determined according to technical specification (dimension, pressure rating and ground condition) 3.3 Suitable type of pipe material selected based on concealed or exposed piping installation, site condition and technical specification
			4. Perform waste pipe setting out	4.1 Waste pipe lay-out determined from construction drawing 4.2 Marking tools and equipment selected and tested for good condition and functionality 4.3 Waste pipe setting clearly marked according to water pipe lay-out 4.4 Waste pipe properly aligned horizontally or vertically according to

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				pipe setting marking 4.5 Waste pipe gradient properly set according to construction drawing
			5. Perform waste pipe and fitting installation	5.1 Required PPE properly worn according to Occupational Safety and Health Act (OSHA) requirement 5.2 Trenching work is carried out with required depth and width as per drawing specification 5.3 Bedding work is carried out with proper levelling and required material as per drawing specification 5.4 Cutting and hacking of brick wall carried out with required depth and width as per drawing specification 5.5 Waste pipe is securely fixed with correct type and dimension of jointing materials as per drawing specification 5.6 Waste pipe fitting levelling and finishing

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				visually checked for workmanship quality and free from leakage 5.7 Manpower working at site complied with safety rules and regulation to avoid injuries, instrument damage and pollution according to safety, health and environmental. 5.8 Work area, tools and equipment cleaned from dirt and properly kept according to housekeeping and safety practices
			6. Perform sanitary pipe and fitting installation	6.1 Required PPE properly worn according to Occupational Safety and Health Act (OSHA) requirement 6.2 Trenching work is carried out with required depth and width as per drawing specification 6.3 Coring of brick wall is carried out with required depth and diameter as

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				per drawing specification 6.4 Sufficient length and direction of sanitary pipe laid and fixed with fitting bracket as per drawing specification 6.5 Sanitary pipe is securely fixed with correct type and dimension of jointing materials as per drawing specification 6.6 Sanitary pipe fitting levelling and finishing visually checked for workmanship quality and free from leakage
			7. Perform sanitary appliances installation	7.1 Required PPE properly worn according to Occupational Safety and Health Act (OSHA) requirement 7.2 Coring of brick wall is carried out with required depth and diameter as per drawing specification 7.3 Type, dimension and location of sanitary

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				appliances laid and fixed as per drawing specification 7.4 Pipe is securely fixed to sanitary appliances with correct type and dimension of jointing materials as per standard sanitary appliances jointing manual 7.5 Sanitary appliance's jointing is visually checked to ensure proper fitting and free from leakage
			8. Perform waste trap installation	8.1 Required PPE properly worn according to Occupational Safety and Health Act (OSHA) requirement 8.2 Correct type of waste trap selected according to work requirement 8.3 Type, dimension and location of waste trap laid and fixed as per drawing specification 8.4 Installed waste trap functionality checked and foul smell is

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				prevented in the system as per regulatory requirement
			9. Carry out waste pipe test	9.1 Waste pipe testing tools and equipment condition checked according to manufacturer's manual 9.2 Waste pipe testing tools and equipment tested for functionality and performance according work instruction 9.3 Waste pipe testing tool and equipment arranged to testing location timely and safely kept 9.4 Leakage test carried out to ensure pipe joints are free from leakage 9.5 Gradient test carried out for smooth flow of waste in the system
			10. Prepare installation and testing report	10.1 Waste pipe installation report prepared with accurate information according

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				to report format 10.2 Waste pipe fitting installation report prepared with accurate information according to report format 10.3 All reports are systematically compiled and timely submitted to superior
5. Water Tank Installation	F432-002-2: 2017 C05	Water Tank Installation describes the competency in selecting the correct type of tank, base and jointing materials to enable to hold the water capacity effectively. A competent person in this CU shall be able to Interpret water tank installation drawing, select water tank type, determine water tank installation requirement, perform water tank and accessories installation, complete water tank installation check list, carry out water tank	1. Interpret water tank installation drawing	1.1 Water tank installation drawing interpreted to determine location of tank installation 1.2 Types and regulatory approved of tank determined from water tank installation drawing and technical specification 1.3 Connection and piping details of tank installation determined from water tank installation drawing
			2. Select water tank type	2.1 Capacity of water tank is determined according to design consumption as approved by

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		testing, prepare installation and test report The outcome of this competency is to ensure that all works are in compliance with Occupational Safety and Health Act (OSHA) requirement Uniform Technical Guideline (UTG) and Uniform Building By Law (UBBL)		regulatory body 2.2 Type of water tank determined from water tank installation drawing 2.3 Installation location determined from water tank installation drawing 2.4 Capacity and type of water tank selected according to tank installation requirement
			3. Prepare water tank base	3.1 Required PPE properly worn according to Occupational Safety and Health Act (OSHA) requirement 3.2 Water tank capacity confirmed according to drawing and minimum capacity approved by regulatory body 3.3 Tank base structure specification determined from water tank drawing 3.4 Water tank base

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				material selected based on tank capacity 3.5 Strong and stable tank base constructed with good finishing according to construction drawing and practices
			4. Perform water tank and accessories installation	4.1 Proper type of jointing materials selected as per construction drawing specification 4.2 Correct length and dimension of water pipe installed as per construction drawing specification 4.3 Correct type and size of water tank fitting installed with good finishing as per construction drawing specification 4.4 Correct type and size of valve installed with good finishing as per construction drawing specification 4.5 Correct type and

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				capacity of water tank and tank cover installed with good finishing as per construction drawing specification 4.6 Correct type and size of water tank accessories installed as per construction drawing specification 4.7 Manpower complied with safety rules and regulation according to safety, health and environmental to avoid injuries, instrument damage and pollution. 4.8 Work area, tools and equipment cleaned from dirt and properly kept according housekeeping and safety practices 4.9 Water tank installation check list completed to ensure water tank installation is done according to design drawing and requirement

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
			5. Carry out water tank testing	5.1 Construction drawing is interpreted to determine dimension, capacity, type and class of water tank 5.2 Work instruction interpreted for scope of work and testing method 5.3 Source of water connected to the pipe to be tested with leakage free 5.4 Correct testing tools and equipment conditions checked and functionality tested according to manufacturer manual 5.5 Water tightness test carried out to ensure water flow stop at maximum level of tank 5.6 Water tank, piping and fitting visually checked free from leakage and sign of leak 5.7 Leakage test results are accurately recorded

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				in standard form 5.8 Water tank testing report prepared with accurate information at required time according to report format 5.9 All reports are systematically compiled and timely submitted to superior
6. Plumbing and Sanitary Maintenance Works	F432-002-2: 2017 C06	Plumbing and Sanitary Maintenance Works describes the competency in performing inspection on faulty materials and carry out the repair and replacement works A competent person in this CU shall be able to carry out water pipe maintenance work, carry out water tank maintenance work, carry out sanitary and waste pipe maintenance work, carry out plumbing & sanitary fixture maintenance work and	1. Carry out water pipe maintenance work	1.1 Sign of faulty or leaking pipe identified by visual inspection upon receiving work instruction 1.2 Pipe routing determined from as built drawing interpretation 1.3 Correct maintenance tools and materials conditions checked and equipment functionality tested according to manufacturer manual 1.4 Water flow isolated by closing water supply main valve 1.5 Defective gasket,

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
		generate maintenance report Apart from complying to regulatory body, UTG and UBBL requirements, cleaning work carried out upon completion of repair or replacement work must conform to Ministry of Health (MOH) requirement		piping parts and valve replaced during minor repair work 1.6 Defective piping system totally replaced during major repair work 1.7 Repair and rectification works are visually checked for good workmanship, free from leakage and water pressure are as per main supply pressure level
			2. Carry out water tank maintenance work	2.1 Sign of faulty and leaking water tank identified by visual inspection upon receiving work instruction 2.2 Pipe routing and valve location determined from as built drawing interpretation 2.3 Correct maintenance tools and materials conditions checked and equipment functionality tested according to

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				manufacturer manual 2.4 Water flow isolated by closing water supply main valve 2.5 Defective fitting, tank parts and valve replaced during minor repair work 2.6 Water tank cleaned free from sludge, dirt and contaminant materials 2.7 Defective water tank replaced during major repair work 2.8 Repair and rectification works are visually checked for good workmanship, free from leakage and water pressure as per main supply pressure level
			3. Carry out sanitary and waste pipe maintenance work	3.1 Sign of faulty or leaking sanitary and waste pipe identified by visual inspection upon receiving work instruction 3.2 Sanitary and waste pipe routing determined from as built drawing

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				interpretation 3.3 Correct maintenance tools and materials conditions checked and equipment functionality tested according to manufacturer manual 3.4 Required PPE properly worn and safety signage placed at strategic location according to SHE procedure 3.5 Water flow isolated by closing water supply main valve 3.6 Defective sanitary and waste pipe parts replaced during minor repair work 3.7 Defective sanitary and waste pipe system replaced during major repair work 3.8 Waste pipe flushing works carried out upon completion of repair or replacement work to ensure smooth flow of effluent/waste 3.9 Repair and rectification

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				works are visually checked for good workmanship and free from leakage
			4. Carry out plumbing and sanitary fixture maintenance work	4.1 Sign of faulty or leaking plumbing and sanitary fixtures identified by visual inspection upon receiving work instruction 4.2 Plumbing and sanitary fixtures location determined from as built drawing interpretation 4.3 Correct maintenance tools and materials conditions checked and equipment functionality tested according to manufacturer manual 4.4 Required PPE properly worn and safety signage placed at strategic location according to SHE procedure 4.5 Water flow isolated by closing water supply main valve 4.6 Defective plumbing and

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				sanitary fixtures parts replaced during minor repair work 4.7 Defective plumbing and sanitary fixtures totally replaced during major repair work 4.8 Plumbing and sanitary system flushing works carried out upon completion of repair or replacement work to ensure smooth flow of effluent/waste 4.9 Repair and rectification works are visually checked for good workmanship and free from leakage
			5. Generate maintenance report	5.1 Water pipe maintenance report prepared with accurate information according to report format 5.2 Water tank maintenance report prepared with accurate information according to report format 5.3 Sanitary and waste pipe

CU TITLE	CU CODE	CU DESCRIPTOR	WORK ACTIVITIES	PERFORMANCE CRITERIA
				maintenance report prepared with accurate information according to report format 5.4 Sanitary fixtures maintenance report prepared with accurate information according to report format 5.5 All reports are systematically compiled and timely submitted to superior

CURRICULUM

NATIONAL OCCUPATIONAL SKILLS STANDARD (NOSS) FOR;

PLUMBING AND SANITARY INSTALLATION OPERATION

LEVEL 2

CURRICULUM OF COMPETENCY UNIT (COCU)

SECTOR	**CONSTRUCTION (F)**						
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**						
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**						
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**						
COMPETENCY UNIT TITLE	**PLUMBING AND SANITARY TECHNICAL DRAWING PREPARATION**						
PRE-REQUISITE (If Applicable)							
LEARNING OUTCOME	The person who is competent in this CU shall be able to ensure that all drawings must be produced prior to work commencement and are prepared according to WSIA and Uniform Building By Law (UBBL) guidelines. Upon completion of this competency units, trainees will be able to:- 1. Prepare Plumbing Drawing 2. Prepare Sanitary Drawing 3. Prepare Waste Pipe Drawing 4. Prepare Construction Drawings 5. Compile Plumbing and Sanitary Drawing						
COMPETENCY UNIT ID	F432-002-2: 2017 C01	**LEVEL**	2	**TRAINING DURATION**	105 Hours	**SKILL CREDIT**	10

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
1. Prepare Plumbing Drawing	1.1 Introduction of plumbing drawing • Purpose • Symbol • Type of line • Drawing ratio • Legend	1.1 Select drawing tools 1.2 Identify symbol and legend in construction drawing 1.3 Prepare technical	ATTITUDE • Observant in identifying type of drawing tools • Details in interpretation of construction drawings. • Precise in	Related Knowledge 6 Related Skill 24	Related Knowledge Lecture, Related Skill Demonstration and	1.1 Introduction of plumbing drawing described 1.2 Type and function of drawing tools listed out and explained

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Drawing projection 1.2 Type and usage of drawing tools, equipment and materials 1.3 Type and usage of Personnel Protective Equipment (PPE) 1.4 Design calculation • Pressure • No of Tapping Point 1.5 Type of technical drawing • Isometric • Schematic • Diagrammatic 1.6 Content and specification of plumbing drawing such	drawing tools, equipment and materials 1.4 Produce plumbing drawing 1.5 Submit plumbing drawing	identifying type pipe route point marking		Observation,	1.3 CAD application interpreted and applied 1.4 Suitable drawing tools checked for good condition and functionality 1.5 Correct symbol and legend for valve, pipe and fitting determined from standard plumbing plan. 1.6 Technical drawing for plumbing prepared with accurate dimension, symbols and legends according to plumbing work requirement 1.7 Complete plumbing drawing prepared according to regulatory body

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	as:- • Tap and Valve • Pipe • Fitting • Colour code 1.7 Procedure of plumbing drawing preparation 1.8 Method of plumbing drawing • Manual • Computerise 1.9 Technique of plumbing drawing 1.10 Introduction to CAD application 1.11 Reference of plumbing drawing preparation such as • UTG • UBBL					requirement 1.8 Plumbing drawing with isometric, schematic and diagrammatic illustrations timely submitted for review

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
2. Prepare Sanitary Drawing	2.1 Introduction of sanitary drawing • Purpose • Method • Technique 2.2 Content and specification of sanitary drawing such as:- • Pipe • Fitting • Trap • Sanitary appliances • Colour code 2.3 Procedure of sanitary drawing preparation 2.4 Reference of sanitary drawing preparation such as • UTG • UBBL	2.1 Select drawing tools 2.2 Identify symbol and legend in construction 2.3 Prepare technical drawing tools, equipment and materials 2.4 Draw sanitary plan 2.5 Submit sanitary drawing for approval	ATTITUDE • Details in interpretation of construction drawings. • Precise in identifying type symbol and legend • Meticulous and precise in selecting type of tools.	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture, Related Skill Demonstration and Observation,	2.1 Type and function of drawing tools listed out and explained 2.2 Construction drawings interpreted with correct symbol and legend for pipe, fitting and fixtures 2.3 Technical drawing for sanitary prepared with accurate dimension, symbols and legends according to plumbing work requirement 2.4 Sanitary drawing with isometric, schematic and diagrammatic illustrations drawn as per requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
3. Prepare Waste Pipe Drawing	3.1 Introduction to waste pipe drawing • Purpose • Method • Technique 3.2 Content and specification of waste pipe drawing such as:- • Pipe • Fitting • Colour Code 3.3 Procedure of sanitary drawing preparation 3.4 Reference of waste pipe drawing preparation such as • UTG • UBBL • Sketch	3.1 Select drawing tools 3.2 Identity symbol and legend 3.3 Prepare technical drawing tools, equipment and materials 3.4 Draw waste pipe plan 3.5 Submit for approval	ATTITUDE • Details in interpretation of construction drawings. • Precise in identifying symbol and legend • Precise in selecting type of tools.	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture, Related Skill Demonstration and Observation,	3.1 Type and function of drawing tools listed out and explained 3.2 Construction drawings interpreted with correct symbol and legend for valve, pipe and fitting 3.3 Technical drawing for waste pipe prepared with accurate dimension, symbols and legends according to plumbing work requirement 3.4 Waste pipe drawing with isometric, schematic and diagrammatic illustrations drawn as per

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						requirements
4. Prepare construction drawings	4.1 Introduction of construction drawing • Purpose • Symbol • Legend • Method • Technique 4.2 Type of construction • Site plan • Layout plan • Detail plan 4.3 Procedure of construction drawing preparation 4.4 Content of Construction Drawing 4.5 Reference of construction drawing preparation such as 4.6 Technique of sketching	4.1 Interpret site plan 4.2 Interpret layout plan 4.3 Prepare technical drawing tools, equipment and materials 4.4 Draw pipe position and specification 4.5 Produce detailed plan	ATTITUDE • Details in interpretation of construction drawings. • Precise in Producing detailed plan	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture, Related Skill Demonstration and Observation	4.1 Site location determined and explained as per site plan 4.2 The pipe line position and piping system configuration explained as per layout plan 4.3 Pipe position and specification is drawn on the detailed plan according to standard construction drawing requirements

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	drawing					
5. Compile plumbing and sanitary drawing	5.1 Procedure of drawing sorting 5.2 Method of drawing sorting 5.3 Technique of drawing binding 5.4 Drawing content format • Project title • Date • Work location 5.5 Procedure of plumbing and sanitary drawing compilation	5.1 Check drawing title 5.2 Check drawing content and completeness 5.3 Sort plumbing and sanitary drawings 5.4 Compile and record plumbing and sanitary drawing	ATTITUDE • Details in interpretation of drawing requirements • Precise in method of checking • Systematic in compiling	Related Knowledge 1 Related Skill 2	Related Knowledge Lecture, Related Skill Demonstration and Observation	5.1 Procedure of drawing sorting explained 5.2 Method of drawing sorting explained 5.3 Technique of drawing binding demonstrated 5.4 Drawings project title, date and work location checked as per drawing standard format 5.5 Drawings are sorted according to type, sizes and scope of work 5.6 Drawings are systematically bonded according to project title, plan, details and scope of work for

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						compilation and record keeping.

EMPLOYABILITY SKILLS

CORE ABILITIES	SOCIAL SKILLS
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 02.05 Read/Interpret flowcharts and pictorial information. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.04 Seek and act constructively upon feedback about work performance. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

TOOLS, EQUIPMENT AND MATERIALS (TEM)

ITEMS	RATIO (TEM : Trainees)
1 Drawing Pens	1:1
2 Drawing Pencils	1:1
3 Drawing Board	1:1
4 T-Square	1:1
5 Sets Squares	1:1
6 Protractors	1:1
7 Rulers	1:1
8 Compass	1:1
9 Templates	1:1
10 Drafting Machines	1:5
11 Perspective Machines	1:5
12 Drafting Paper	As required
13 Thick Draft Paper	As required
14 Tracing Paper	As required
15 Sketching Paper	As required
16 Layout Pads	As required
17 Tracing Tube	1:1
18 Triangle Scale Rules	1:1
19 Oval Scale Rules	1:1
20 Modelling Wires	1:5
21 Cutting Mats	1:5
22 Craft Knives	1:5
23 Plumbing Symbols and Legend	1:5
24 CAD software	1:25
25 Portfolios – filing folder	1:25
26 Storage Cabinet	1:25

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SECTOR	**CONSTRUCTION (F)**						
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**						
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**						
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**						
COMPETENCY UNIT TITLE	**PLUMBING AND SANITARY WORKS PREPARATION**						
PRE-REQUISITE (If Applicable)							
LEARNING OUTCOME	The person who is competent in this CU shall be able to perform plumbing and sanitary work preparation as per standard requirements. Upon completion of this competency units, trainees will be able to:- 1. Determine Work Position and Location 2. Prepare Water Pipe Tools and Equipment 3. Prepare Waste Pipe Tool and Equipment 4. Request Piping Material 5. Prepare Material Storage 6. Carry Out Tools and Equipment Storage						
COMPETENCY UNIT ID	F432-002-2: 2017 C02	**LEVEL**	2	**TRAINING DURATION**	96 Hours	**SKILL CREDIT**	10

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
1. Determine Work Position And Location	1.1 Content of construction drawing • Pipe position • Site location • Sanitary fixtures • Location of valve • Location of	1.1 Interpret construction drawing 1.2 Determine pipe route point marking 1.3 Identify marking tools	ATTITUDE • Details in interpretation of construction drawings. • Precise in identifying type pipe route point marking • Meticulous and	Related Knowledge 6 Related Skill 12	Related Knowledge Lecture, Related Skill Demonstration and Observation	1.1 Position and location of plumbing work determined according to approved construction drawing 1.2 Pipe route point checked from

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	water tank 1.2 Pipe route marking procedure • Plumb • Level • Gradient 1.3 Type and function of marking tools and equipment 1.4 Application of marking tools		precise selecting type of tools.			construction drawing to ensure correct alignment 1.3 Correct marking tools are determined and selected according to work requirement and location
2. Prepare Water Pipe Tools And Equipment	2.1 Type of water pipe tool and equipment 2.2 Function of water pipe tool and equipment 2.3 Type and usage of Personnel Protective Equipment (PPE) 2.4 Water pipe tools and equipment handling procedure	2.1 Identify tools and equipment for jointing, testing, cutting and trenching 2.2 Determine usage of tools and equipment 2.3 Test tool and equipment functionality 2.4 Sort tools and equipment	<u>ATTITUDE</u> • Precise in identifying type of tools and equipment • Precise in selecting method of testing <u>SAFETY</u> • Adhere to safety procedures and guidelines	<u>Related Knowledge</u> 6 <u>Related Skill</u> 6	<u>Related Knowledge</u> Lecture, <u>Related Skill</u> Demonstration and Observation	2.1 Construction drawing interpreted to identify and select types of tool and equipment required 2.2 Tool and equipment for trenching, cutting, jointing and testing selected to ensure quality of work to suit site condition and meet standard specification

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						2.3 Tool and equipment condition checked according to manufacturer's manual and scope of work 2.4 Tool and equipment tested for functionality and performance according work instruction 2.5 Tool and equipment received and sorted out according to work instruction 2.6 Tool and equipment usage determined according to work instruction

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
3. Prepare Waste Pipe Tool And Equipment	3.1 Type of waste pipe tool and equipment 3.2 Function of waste pipe tool and equipment 3.3 Waste pipe tools and equipment handling procedure	3.1 Select tools and equipment 3.2 Determine usage of tools and equipment 3.3 Check tool condition 3.4 Test tools and equipment functionality	ATTITUDE • Precise in identifying type of tools and equipment • Precise in selecting Method of checking SAFETY • Adhere to safety procedures and guidelines	Related Knowledge 6 Related Skill 6	Related Knowledge Lecture, Related Skill Demonstration and Observation	3.1 Construction drawing interpreted to identify and select types of tool and equipment required 3.2 Tool and equipment for trenching, cutting, jointing and testing selected to ensure quality of work to suit site condition and meet standard specification 3.3 Tool and equipment condition checked according to manufacturer's manual and scope of work 3.4 Tool and equipment tested for functionality and performance according work instruction

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
4. Request Piping Material	4.1 Type of piping system • Cold water • Hot water 4.2 Type and specification of pipe 4.3 Class/grade of pipe 4.4 Material preparation check list 4.5 Procedure of material requisition 4.6 Material quality control process 4.7 Procedure of receiving requested material	4.1 Prepare material preparation check list 4.2 Submit material requisition 4.3 Inspect received material 4.4 Reject defective material	ATTITUDE • Precise in identifying type of piping materials • Precise in material quality control	Related Knowledge 18 Related Skill 12	Related Knowledge Lecture, Related Skill Demonstration and Observation	4.1 Material check list prepared according to construction drawing, Bill of Quantities (BQ) and work instruction 4.2 Material quantity, size, grade, type and standard specification are submitted for requisition 4.3 Materials received and inspected for quantity, quality, size, grade, type and standard specification 4.4 Defective material rejected base on non-compliance of grade, class, type, standard and technical specification

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
5. Carry out Material Storage	5.1 Type of hazardous material 5.2 System of storage • FIFO • LIFO 5.3 Material handling procedure 5.4 Introduction to Material Safety Data Sheet (MSDS) 5.5 Procedure of inventory record updating	5.1 Identify storage location 5.2 Identify hazardous material storage location 5.3 Identify space availability 5.4 Store the material 5.5 Update inventory record	ATTITUDE • Observant in identifying storage location • Precise in identifying type of hazardous material SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices	Related Knowledge 6 Related Skill 6	Related Knowledge Lecture Related Skill Demonstration and Observation	5.1 Material storage location identified according to work site condition, scope of work and types of piping material 5.2 Hazardous material storage in dry ventilated area according to Material Safety Data Sheet (MSDS) 5.3 Material stored according to storage procedure for accessibility, safety, mobilization and efficient acquisition of material 5.4 Material stored according to inventory control procedure for material turn over, wastage, quality and stock control

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
6. Carry Out Tools And Equipment Storage	6.1 Type and usage of plumbing tool 6.2 Type and usage of plumbing equipment 6.3 Method of tools and equipment cleaning 6.4 Technique of tools and equipment condition inspection 6.5 Tools and equipment servicing scheduling 6.6 Procedure of asset inventory record 6.7 Procedure of asset disposal	6.1 Perform tool and equipment cleaning 6.2 Identify defective tools and equipment 6.3 Keep maintenance record 6.4 Perform house keeping	ATTITUDE • Observant in identifying tools and equipment conditions • Precise in identifying asset disposal procedure SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices	Related Knowledge 3 Related Skill 9	Related Knowledge Lecture, Related Skill Demonstration and Observation	6.1 Tool and equipment cleaned from dirt/grease and checked for functionality to ensure quality of work 6.2 Schedule servicing procedure on equipment carried out according to manufacturer`s manual 6.3 Defective tools and equipment identified for repair or part replacement according to manufacturer`s manual 6.4 Tools and equipment kept according good housekeeping and safety practices 6.5 Maintenance record systematically filed

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						according to standard filing system

EMPLOYABILITY SKILLS

CORE ABILITIES	**SOCIAL SKILLS**
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 02.05 Read/Interpret flowcharts and pictorial information. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.04 Seek and act constructively upon feedback about work performance. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

TOOLS, EQUIPMENT AND MATERIALS (TEM)

ITEMS	RATIO (TEM : Trainees)
1 Tape Measure	1:1
2 Multi tip screw driver	1:1
3 Vise grip pliers	1:1
4 Allen keys	1:1
5 Shovels, long/short	1:5
6 Safety gloves	1:1
7 Goggles	1:1
8 Ear Plug	1:1
9 Trowel	1:1
10 Claw hammer	1:5
11 Ball peen hammer	1:5
12 Side cutters	1:5
13 Socket set	1:5
14 Tin snips	1:5
15 Sledge hammer	1:5
16 Hand saw	1:5
17 Hack saw	1:5
18 Regular screw driver	1:5
19 Stubby screw drivers	1:5
20 Cold/wood chisel	1:5
21 Step ladder	1:5
22 Flash light	1:5
23 Hole saw kit	1:5
24 Various adjustable wrenches	1:5
25 Needle-nose pliers	1:5
26 Crow bar	1:5
27 Caulking gun	1:5
28 Drywall knife	1:5
29 Box cutter	1:5
30 Wire strippers	1:5

31	Mini pipe cutter	1:5
32	PEX Crimpers	1:5
33	Steel pipe cutter	1:5
34	Spud wrench	1:5
35	Pipe wrenches 6”/10”/14”/18”/24”	1:5
36	Offset hex wrench	1:5
37	Cast iron snap cutter	1:5
38	Torpedo level	1:5
39	Pipe tapping tools	1:5
40	Internal pipe wrench	1:5
41	Internal pipe cutter	1:5
42	Pipe reamer	1:5
43	Medium copper pipe cutter 2"	1:5
44	PEX cinch ring crimper	1:5
45	PVC Hand saw	1:5
46	Flaring tool kit	1:5
47	Offset pipe wrench 14"	1:5
48	Strap wrench	1:5
49	Basin wrench / telescopic	1:5
50	Pipe extractors	1:5
51	Plastic tube cutter/ scissor type	1:5
52	Faucet seat extractor	1:5
53	Faucet handle puller	1:5
54	Sink plunger	1:5
55	Plunger	1:5
56	PO wrench	1:5
57	Reciprocating saw	1:5
58	Hammer drill	1:5
59	Welding equipment	1:5
60	Generator	1:25
61	Teflon Tape	1:25
62	50/50 solder	As required
63	Flux soldering paste	As required

64 Silicone	As required
65 Lead free solder	As required
66 Sand cloth	As required
67 Gasket material	As required
68 Fitting brush	As required
69 Copper strapping	As required
70 Plumbers putty	As required
71 Equipment manufacturer`s manual	1:5

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SECTOR	**CONSTRUCTION (F)**						
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**						
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**						
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**						
COMPETENCY UNIT TITLE	**WATER PIPE INSTALLATION**						
PRE-REQUISITE (If Applicable)							
LEARNING OUTCOME	The person who is competent in this CU shall be able to perform water pipe installation as per standard requirements. Upon completion of this competency units, trainees will be able to:- 1. Interpret work instruction 2. Determine water pipe installation requirement 3. Select pipe material 4. Perform water pipe setting out 5. Perform water pipe and fitting installation 6. Carry out water pipe pressure Test 7. Carry out water pipe leakage Test 8. Prepare pipe Installation and Test Reports						
COMPETENCY UNIT ID	F432-002-2: 2017 C03	**LEVEL**	2	**TRAINING DURATION**	314Hours	**SKILL CREDIT**	31

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
1. Interpret Work Instruction	1.1 Purpose of work instruction 1.2 Content of work instruction 1.3 Scope of installation work 1.4 Installation work schedule	1.1 Interpret construction drawing 1.2 Check work location 1.3 Study scope of work 1.4 Check installation work schedule	ATTITUDE • Precise in interpretation on work instruction • Observant in checking location	Related Knowledge 3 Related Skill 6	Related Knowledge Lecture Related Skill Demonstration and Observation	1.1 Content of work instruction interpreted and explained 1.2 Construction drawing interpreted to determine the exact work location

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						1.3 Location is inspected to determine the current work area condition
2. Determine Water Pipe Installation Requirement	2.1 Type and usage of water pipe material 2.2 Type and usage of water pipe fittings 2.3 Type and usage of water pipe valve 2.4 Type and function of water pipe joints 2.5 Type of jointing material 2.6 Type of water pipe system • Hot • Cold 2.7 Material calculation method	2.1 Interpret water pipe installation drawing 2.2 Identify type of material 2.3 Identify type of fitting 2.4 Determine type of joint 2.5 Determine type of jointing material 2.6 Determine Type of valve 2.7 Determine water pipe system (hot/cold) 2.8 Calculate required material quantity	ATTITUDE • Precise in interpretation of drawing • Detailed in identifying type of materials	Related Knowledge 4 Related Skill 2	Related Knowledge Lecture Related Skill Demonstration and Observation	2.1 Water pipe installation drawing interpreted to ensure that all symbols and legends are correctly drawn according to drawing standard 2.2 Type of materials, fitting, jointing material and valve required are indicated in the drawing 2.3 Hot or cold water pipe system determined according to approved installation drawing 2.4 Type of materials

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						and quantity required for water pipe installation determined
3. Select Pipe Material	3.1 Introduction to piping system • Hot • Cold 3.2 Type of piping system installation. • Rain water harvesting • Concealed • Exposed • Direct/indirect 3.3 Type and usage of pipe material • Metal o Stainless Steel o Copper o Mild steel o Ductile iron • Plastic o PVC-U o ABS o Poly	3.1 Determine type of pipe system 3.2 Determine type of pipe material 3.3 Select suitable pipe material 3.4 Arrange pipe material to site	ATTITUDE • Precise in identifying type of pipe • Detailed and precise in checking	Related Knowledge 40 Related Skill 20	Related Knowledge Lecture Related Skill Demonstration and Observation	3.1 Type of cold/hot system selected according to technical specification (dimension, pressure rating , ground condition) 3.2 Concealed or exposed pipe type selected according to drawing, site condition and technical specification 3.3 Correct dimension selected based on pressure rating and ground condition according to approved technical specification

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	Propylene Random (PPR) o MDPE o PB o HDPE • Composite o Poly aluminium o Poly steel o PEX o Poly 3.4 Piping material specification • Dimension • Grade/class • Standard • Pressure rating • Weather resistance • Chemical resistance 3.5 Ground properties/ condition • Acidic • Saline • Peaty					

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
4. Perform Water Pipe Setting Out	4.1 Content of piping drawing • Pipe route • Pipe location 4.2 Procedure of water pipe setting out 4.3 Technique of pipe alignment • Plumb • Level • Gradient 4.4 Method of marking water pipe setting	4.1 Interpret construction drawing 4.2 Select marking tool and equipment 4.3 Carry out pipe alignment 4.4 Mark water pipe setting	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique • Meticulous and precise in performing water pipe setting out • Systematic in performing pipe alignment work • Time and cost conscious in completing task SAFETY • Adhere to safety procedures and guidelines • Use correct PPE	Related Knowledge 12 Related Skill 48	Related Knowledge Lecture Related Skill Demonstration and Observation	4.1 Water pipe setting out accurately according to construction drawing. 4.2 Water pipe setting out according to site requirement such as ground, floor, wall and ceiling condition 4.3 Marking tools and equipment selected according to site condition and work instruction 4.4 Pipe alignment carried out to ensure functionality of the system

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
			ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			
5. Perform Water Pipe And Fitting Installation	5.1 Type and usage of PPE 5.2 Purpose of trenching work 5.3 Method of trenching work • Excavation • Pipe jacking 5.4 Type of bedding work • Road crossing • Concrete 5.5 Purpose of bedding work 5.6 Type and usage of bedding material 5.7 Technique of	5.1 Wear proper PPE 5.2 Perform Trenching work 5.3 Perform Bedding work 5.4 Perform brick wall cutting and hacking work 5.5 Lay and fix pipe and fittings 5.6 Perform Pipe jointing 5.7 Check pipe jointing quality 5.8 Clean work	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique • Meticulous and precise in performing water pipe and fitting installation • Systematic in performing pipe laying and fixing	Related Knowledge 30 Related Skill 102	Related Knowledge Lecture Related Skill Demonstration and Observation	5.1 Suitable PPE listed out according to OSHA requirement 5.2 Trenching and bedding done according to Uniform Technical Guideline (UTG) and specification 5.3 Cutting and hacking of brick wall carried out using appropriate tools according to UBBL 5.4 Pipe and fitting are laid and fixed

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	brick wall cutting and hacking 5.8 Water pipe and fitting installation Guideline • UTG • UBBL 5.9 Technique of pipe laying and fixing 5.10 Type and usage of pipe fitting components • Valve • Tap • Pipe Bracket 5.11 Method of pipe jointing • Threaded Joint • Compression Joint • Solvent Cement Joint • Brazing Joint • Soldering Joint • Fusion Joint	area	<u>SAFETY</u> • Adhere to safety procedures and guidelines • Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			according to approved detail installation drawing and UTG 5.5 Pipe jointing carried out using correct types of joint and jointing materials to ensure it is securely fixed following UTG 5.6 Pipe jointing works visually checked using installation check list to ensure no leakage 5.7 Manpower working at site complied with safety rules and regulation to avoid injuries, instrument damage and pollution according to safety, health and environmental. 5.8 Work area, tools and equipment

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Push Fit • Spigot Socket • Crimping Joint • Flange Joint • Coupler Joint 5.12 Method of pipe installation quality checking • Visual • Physical • Mechanical inspection device					cleaned from dirt and properly kept according to housekeeping and safety practices
6. Carry Out Water Pipe Pressure Test	6.1 Distribution and service pipe specification • Class • type • size • diameter • length 6.2 Water pipe pressure test method statement. 6.3 Type and usage of tools and equipment for pressure testing	6.1 Interpret construction drawing 6.2 Interpret work instruction/method statement 6.3 Determine location of pressure testing 6.4 Identify source of water 6.5 Prepare tools and equipment for pressure testing	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique SAFETY • Adhere to safety procedures and guidelines • Use correct	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture Related Skill Demonstration and Observation	6.1 Construction drawing is checked to determine class, type, size, diameter and length of Distribution and Service Pipe (excluding Communication Pipe) to be tested 6.2 Work instruction referred to determine scope of work and

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Pressure pump (electric, motor & manual) • Pipe stand • Gate valve / stop cock • Check valve / air valve • Pressure gauge • End cap • Storage tank • Pressure hose • Pressure recorder • Stop watch 6.4 Pressure test procedure 6.5 Pressure test reporting format	6.6 Carry out pressure test 6.7 Prepare pressure test report	PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			method statement to be used for testing 6.3 Location of pressure test checked to mobilise testing tools and equipment 6.4 Source of water to be identified and prepared for connection to the pipe to be tested 6.5 Tools and equipment prepared to facilitate testing of the pipelines. 6.6 Pressure test carried out according to standard testing procedure and specification. 6.7 Pressure test results are recorded in standard form as required by

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						standard testing procedure and specification
7. Carry Out Water Pipe Leakage Test	7.1 Type and usage of tools &equipment for leakage test • Pressure pump (electric, motor & manual) • Pipe stand • Gate valve / stop cock • Check valve / air valve • Pressure gauge • End cap • Storage tank • Pressure Hose • Pressure recorder 7.2 Leakage testing procedure 7.3 Leakage test	7.1 Interpret construction drawing 7.2 Interpret work instruction/method statement 7.3 Determine location of leakage testing 7.4 Prepare source of water for testing 7.5 Prepare tools and equipment for leakage test 7.6 Carry out leakage test 7.7 Prepare leakage test report	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce,	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture Related Skill Demonstration and Observation	7.1 Construction drawing is checked to determine size, diameter and length of Distribution and Service Pipe (excluding Communication Pipe) to be tested 7.2 Work instruction obtained to determine scope of work and method statement to be used for leakage testing 7.3 Location of leakage test checked to mobilise testing tools and equipment 7.4 Source of water to be identified and

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	reporting format		Reuse and Recycle) practices			prepared for connection to the pipe to be tested 7.5 Tools and equipment prepared to facilitate leakage testing of the pipelines. 7.6 Leakage test carried out according to standard testing procedure and specification. Water Operator's requirements 7.7 Leakage test results are recorded in standard form as required by standard testing procedure and specification

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
8. Prepare Pipe Installation And Test Reports	8.1 Installation and testing report format 8.2 Installation and testing report content 8.3 Installation and testing reporting procedure	8.1 Prepare water pipe installation report 8.2 Prepare water pipe fitting installation report 8.3 Compile Testing documentation 8.4 Submit testing report	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique	Related Knowledge 3 Related Skill 3	Related Knowledge Lecture Related Skill Demonstration and Observation	8.1 Water pipe installation report prepared at required time according to report format 8.2 Water pipe fitting installation report prepared at required time according to report format 8.3 Test report prepared at required time according to report format 8.4 All reports are compiled based on report type according to standard filing system

Employability Skills

CORE ABILITIES	**SOCIAL SKILLS**
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 02.05 Read/Interpret flowcharts and pictorial information. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.04 Seek and act constructively upon feedback about work performance. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

TOOLS, EQUIPMENT AND MATERIALS (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Tape Measure	1:1
2. Multi tip screw driver	1:1
3. Vise grip pliers	1:1
4. Allen keys	1:1
5. Shovels, long/short	1:5
6. Safety gloves	1:1
7. Goggles	1:1
8. Ear Plug	1:1
9. Trowel	1:1
10. Claw hammer	1:5
11. Ball peen hammer	1:5
12. Side cutters	1:5
13. Socket set	1:5
14. Tin snips	1:5
15. Sledge hammer	1:5
16. Hand saw	1:5
17. Hack saw	1:5
18. Regular screw driver	1:5
19. Stubby screw drivers	1:5
20. Cold/wood chisel	1:5
21. Step ladder	1:5
22. Flash light	1:5
23. Hole saw kit	1:5
24. Various adjustable wrenches	1:5
25. Needle-nose pliers	1:5
26. Crow bar	1:5
27. Caulking gun	1:5
28. Drywall knife	1:5
29. Box cutter	1:5
30. Wire strippers	1:5

31. Mini pipe cutter	1:5
32. PEX Crimpers	1:5
33. Steel pipe cutter	1:5
34. Spud wrench	1:5
35. Pipe wrenches 6”/10”/14”/18”/24”	1:5
36. Offset hex wrench	1:5
37. Cast iron snap cutter	1:5
38. Torpedo level	1:5
39. Pipe tapping tools	1:5
40. Internal pipe wrench	1:5
41. Internal pipe cutter	1:5
42. Pipe reamer	1:5
43. Medium copper pipe cutter 2"	1:5
44. PEX cinch ring crimper	1:5
45. PVC Hand saw	1:5
46. Flaring tool kit	1:5
47. Offset pipe wrench 14"	1:5
48. Strap wrench	1:5
49. Basin wrench / telescopic	1:5
50. Pipe extractors	1:5
51. Plastic tube cutter/ scissor type	1:5
52. Faucet seat extractor	1:5
53. Faucet handle puller	1:5
54. Sink plunger	1:5
55. Plunger	1:5
56. PO wrench	1:5
57. Reciprocating saw	1:5
58. Hammer drill	1:5
59. Welding equipment	1:5
60. Generator	1:25
61. Teflon Tape	1:25
62. 50/50 solder	As required
63. Flux soldering paste	As required

64. Silicone	As required
65. Lead free solder	As required
66. Sand cloth	As required
67. Gasket material	As required
68. Fitting brush	As required
69. Copper strapping	As required
70. Plumbers putty	As required
71. Equipment manufacturer`s manual	1:5

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SECTOR	**CONSTRUCTION (F)**						
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**						
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**						
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**						
COMPETENCY UNIT TITLE	**WASTE PIPE INSTALLATION**						
PRE-REQUISITE (If Applicable)							
LEARNING OUTCOME	The person who is competent in this CU shall be able to perform waste pipe installation as per standard requirements. Upon completion of this competency units, trainees will be able to:- 1. Interpret work instruction 2. Determine waste pipe installation requirement 3. Select pipe material 4. Perform waste pipe setting out 5. Perform waste pipe and fitting installation 6. Perform sanitary pipe and fitting installation 7. Perform sanitary appliances installation 8. Perform waste trap installation 9. Carry out waste pipe Test 10. Prepare Installation and Testing Report						
COMPETENCY UNIT ID	F432-002-2: 2017 C04	**LEVEL**	2	**TRAINING DURATION**	347 Hours	**SKILL CREDIT**	35

WORK ACTIVITIES	**RELATED KNOWLEDGE**	**RELATED SKILL**	**ATTITUDE/ SAFETY/ ENVIRONMENT**	**TRAINING HOURS**	**DELIVERY MODE**	**ASSESSMENT CRITERIA**
1. Interpret Work Instruction	1.1 Purpose of work instruction 1.2 Content of work instruction 1.3 Scope of installation work 1.4 Installation work schedule	1.1 Interpret construction drawing 1.2 Check work location 1.3 Study scope of work 1.4 Check	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting	Related Knowledge 3 Related Skill 6	Related Knowledge Lecture Related Skill Demonstration	1.1 Construction drawing interpreted to determine waste pipe installation location 1.2 Location is inspected to

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
		installation work schedule	technique		and Observation	determine the current condition 1.3 Scope of work determined based on work requirement 1.4 Schedule is checked to determine starting and completion date
2. Determine Waste Pipe Installation Requirement	2.1 Type and usage of waste pipe material 2.2 Type and usage of waste pipe fittings 2.3 Type and usage of waste pipe valve 2.4 Type and function of waste pipe joints 2.5 Type of jointing material 2.6 Type of waste pipe system 2.7 Material	2.1 Interpret waste pipe installation drawing 2.2 Identify type of material 2.3 Identify type of fitting 2.4 Determine type of joint 2.5 Determine type of jointing material 2.6 Determine Type of valve 2.7 Determine waste pipe system	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique	Related Knowledge 4 Related Skill 2	Related Knowledge Lecture Related Skill Demonstration and Observation	2.1 Waste pipe Installation drawing interpreted to ensure that all symbols and legends are correctly drawn according to drawing standard 2.2 Type of materials, fitting, jointing material and valve required are indicated in the drawing 2.3 Waste pipe system

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	calculation method	2.8 Calculate required material quantity				determined according to approved installation drawing 2.4 Type of materials and quantity required for wastepipe installation determined
3. Select Pipe Material	3.1 Introduction to waste piping system • Concealed • Exposed 3.2 Type and usage of waste pipe material • Metal o Cast iron o Ductile iron • Plastic o PVC-U o HDPE o MDPE • Vitrified Clay Pipe (VCP) 3.3 Waste pipe	3.1 Determine type of pipe system 3.2 Determine type of pipe material 3.3 Select suitable pipe material	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique	Related Knowledge 30 Related Skill 18	Related Knowledge Lecture, Related Skill Demonstration and Observation	3.1 Type of waste pipe selected according to technical specification (dimension, pressure rating , ground condition) 3.2 Concealed/exposed pipe type selected according to drawing, site condition and technical specification 3.3 Correct dimension selected based on pressure rating and ground

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	specification • Dimension • Grade/class • Standard • Weather resistance • Chemical resistance 3.4 Ground property/condition • Acidic • Saline • Peaty					condition according to approved technical specification
4. Perform Waste Pipe Setting Out	4.1 Content of piping drawing • Pipe route • Pipe location 4.2 Procedure of waste pipe setting out 4.3 Technique of pipe alignment • Plumb • Gradient 4.4 Method of marking water pipe setting	4.1 Interpret construction drawing 4.2 Select marking tool and equipment 4.3 Carry out pipe alignment 4.4 Mark waste pipe setting	<u>ATTITUDE</u> • Precise in identifying construction drawing • Detailed and precise in selecting technique <u>SAFETY</u> • Adhere to safety procedures and guidelines	<u>Related Knowledge</u> 6 <u>Related Skill</u> 18	<u>Related Knowledge</u> Lecture, <u>Related Skill</u> Demonstration and Observation	4.1 Waste pipe setting out accurately following construction drawing. 4.2 Waste pipe setting out according to site requirement such as ground, floor, wall and ceiling condition 4.3 Marking tools and equipment selected according to site condition

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
			• Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			and work instruction 4.4 Pipe alignment carried out to ensure functionality of the system As above 4.5 Waste pipe gradient is set according to drawing to ensure functionality of system
5. Perform Waste Pipe And Fitting Installation	5.1 Type and usage of PPE 5.2 Purpose of trenching work 5.3 Method of trenching work • Excavation • Backfilling 5.4 Type of bedding work 5.5 Type and usage of bedding material 5.6 Wastepipe and fitting installation	5.1 Wear proper PPE 5.2 Perform trenching work 5.3 Perform bedding work 5.4 Perform brick wall coring work 5.5 Lay and fix waste pipe and fittings 5.6 Perform waste pipe jointing 5.7 Check waste pipe jointing	<u>ATTITUDE</u> • Precise in identifying construction drawing • Detailed and precise in selecting technique <u>SAFETY</u> • Adhere to safety procedures and guidelines • Use correct	<u>Related Knowledge</u> 18 <u>Related Skill</u> 36	<u>Related Knowledge</u> Lecture, <u>Related Skill</u> Demonstration and Observation	5.1 Suitable PPE is used according to Occupational Safety And Health Act (OSHA) requirement 5.2 Trenching and bedding done according to UBBL and specification 5.3 Cutting and hacking of brick wall carried out using appropriate tools according to UBBL

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	guideline • UBBL 5.7 Technique of pipe laying and fixing 5.8 Procedure of laying and fixing 5.9 Type and function of pipe jointing • Solvent cement joint • Push fit • Spigot socket • Flange joint • Coupler joint 5.10 Method of waste pipe checking • Visual • Physical • Mechanical/ electronic device	quality 5.8 Clean work area	PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			5.4 Pipe and fitting are laid and fixed according to approved detail installation drawing and UTG 5.5 Pipe jointing carried out using correct types of joint and jointing materials to ensure it is securely fixed following UTG 5.6 Pipe jointing works visually checked using installation check list to ensure no leakage 5.7 Manpower complied to safety rules and regulation according to safety, health and environmental to avoid injuries, instrument damage and pollution.

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						5.8 Work area, tools and equipment cleaned from dirt and properly kept according to housekeeping and safety practices
6. Perform Sanitary Pipe And Fitting Installation	6.1 Sanitary pipe and fitting installation guideline 6.2 Sanitary pipe & fitting laying and fixing procedure 6.3 Sanitary pipe jointing method • Compression joint • Solvent cement joint • Fusion joint • Push fit • Spigot socket • Flange joint • Coupler joint 6.4 Method of sanitary pipe checking	6.1 Wear proper PPE 6.2 Perform Trenching work 6.3 Perform brick wall coring work 6.4 Lay and fix sanitary pipe and fittings 6.5 Perform sanitary pipe jointing 6.6 Check sanitary pipe jointing quality 6.7 Clean work area	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to	Related Knowledge 12 Related Skill 36	Related Knowledge Lecture Related Skill Demonstration and Observation	6.1 Suitable PPE is used according to Occupational Safety And Health Act (OSHA) requirement 6.2 Trenching done according to Uniform Technical Guideline (UTG) and specification 6.3 Coring of brick wall carried out using appropriate tools according to UBBL 6.4 Pipe, fitting and bracket are laid and fixed according to approved detail

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Visual • Physical • Mechanical/electronic Device		Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			installation drawing and UTG 6.5 Pipe jointing carried out using correct types of joint and jointing materials to ensure it is securely fixed following UTG 6.6 Pipe jointing works visually checked using installation check list to ensure no leakage
7. Perform Sanitary Appliances Installation	7.1 Type and usage of sanitary appliances • Water closet • Wash hand Basin • Kitchen sink • Urinal • Bidet • Shower tray • Bath tub 7.2 Water closet installation procedure	7.1 Wear proper PPE 7.2 Perform brick wall coring work 7.3 Lay and fix sanitary appliances 7.4 Select pipe jointing 7.5 Joint sanitary appliances pipe 7.6 Check pipe	<u>ATTITUDE</u> • Precise in identifying construction drawing • Detailed and precise in selecting technique <u>SAFETY</u> • Adhere to safety procedures and	<u>Related Knowledge</u> 30 <u>Related Skill</u> 54	<u>Related Knowledge</u> Lecture <u>Related Skill</u> Demonstration and Observation	7.1 Suitable PPE worn at work site according to SHE requirement 7.2 Brick wall coring carried out using suitable tools and equipment according to drawing and UBBL 7.3 All sanitary appliances must be tested by accreditation body,

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Low level • High level 7.3 Wash hand basin installation procedure 7.4 Kitchen sink installation procedure 7.5 Urinal installation procedure 7.6 Bidet installation procedure 7.7 Shower tray installation procedure 7.8 Bath tub installation procedure • Long bath • Jacuzzi 7.9 Sanitary appliances pipe jointing method • solvent cement joint • push fit • spigot socket • coupler joint	joint quality	guidelines • Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			registered and approved by regulatory body and installed according to manufacturer`s installation manual 7.4 Correct pipe jointing material is applied according to standard sanitary appliances jointing manual 7.5 Sanitary appliances jointing is visually checked to ensure proper fitting and free from leakage

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
8. Perform Waste Trap Installation	8.1 Type and usage of waste trap • Floor trap • Bottle trap • P trap • S trap • Gully trap • Grease trap 8.2 Floor trap installation procedure 8.3 Bottle trap installation procedure 8.4 P trap installation procedure 8.5 S trap installation procedure 8.6 Gully trap installation procedure 8.7 Grease trap installation procedure	8.1 Wear proper PPE 8.2 Lay and fix waste trap 8.3 Carry out waste trap pipe jointing 8.4 Check waste trap installation quality	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices	Related Knowledge 12 Related Skill 30	Related Knowledge Lecture Related Skill Demonstration and Observation	8.1 Suitable PPE is used according to Occupational Safety And Health Act (OSHA) requirement 8.2 Suitable waste trap selected according to requirement 8.3 Waste trap laid and fixed according to drawing, technical specification as stated in UBBL 8.4 Waste trap checked to ensure functionality and prevent foul smell in the system

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
9. Carry Out Waste Pipe Test	9.1 Purpose of Leakage and gradient test 9.2 Type and usage of tools &equipment for leakage test 9.3 Leakage testing procedure 9.4 Type and usage of tools &equipment for gradient test 9.5 Gradient testing procedure	9.1 Prepare waste pipe testing tools, equipment and material 9.2 Perform leakage test 9.3 Perform gradient test 9.4 Record testing result	ATTITUDE • Precise in identifying type of tests • precise in selecting technique and procedures • Detailed in reporting SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture Related Skill Demonstration and Observation	9.1 Tools, equipment and material for waste pipe testing listed out and explained 9.2 Leakage test carried out to ensure pipe joints fixed to water tightness 9.3 Gradient test carried out to ensure smooth flow of waste in the system

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
10. Prepare Installation and Testing Report	10.1 Installation and testing report format 10.2 Installation and testing report content 10.3 Installation and testing reporting procedure	10.1 Prepare water pipe installation report 10.2 Prepare water pipe fitting installation report 10.3 Compile Testing documentation 10.4 Submit testing report	ATTITUDE • Precise in identifying construction drawing • Detailed and precise in selecting technique	Related Knowledge 6 Related Skill 12	Related Knowledge Lecture Related Skill Demonstration and Observation	10.1 Waste pipe installation report prepared at required time according to report format 10.2 Waste pipe fitting installation report prepared at required time according to report format 10.3 Test report prepared at required time according to report format 10.4 All reports are compiled based on report type according to standard filing system

EMPLOYABILITY SKILLS

CORE ABILITIES	**SOCIAL SKILLS**
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 02.05 Read/Interpret flowcharts and pictorial information. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.04 Seek and act constructively upon feedback about work performance. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

TOOLS, EQUIPMENT AND MATERIALS (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Tape Measure	1:1
2. Multi tip screw driver	1:1
3. Vise grip pliers	1:1
4. Allen keys	1:1
5. Shovels, long/short	1:5
6. Safety gloves	1:1
7. Goggles	1:1
8. Ear Plug	1:1
9. Trowel	1:1
10. Claw hammer	1:5
11. Ball peen hammer	1:5
12. Side cutters	1:5
13. Socket set	1:5
14. Tin snips	1:5
15. Sledge hammer	1:5
16. Hand saw	1:5
17. Hack saw	1:5
18. Regular screw driver	1:5
19. Stubby screw drivers	1:5
20. Cold/wood chisel	1:5
21. Step ladder	1:5
22. Flash light	1:5
23. Hole saw kit	1:5
24. Various adjustable wrenches	1:5
25. Needle-nose pliers	1:5
26. Crow bar	1:5
27. Caulking gun	1:5
28. Drywall knife	1:5
29. Box cutter	1:5
30. Wire strippers	1:5

31. Mini pipe cutter	1:5
32. PEX Crimpers	1:5
33. Steel pipe cutter	1:5
34. Spud wrench	1:5
35. Pipe wrenches 6”/10”/14”/18”/24”	1:5
36. Offset hex wrench	1:5
37. Cast iron snap cutter	1:5
38. Torpedo level	1:5
39. Pipe tapping tools	1:5
40. Internal pipe wrench	1:5
41. Internal pipe cutter	1:5
42. Pipe reamer	1:5
43. Medium copper pipe cutter 2"	1:5
44. PEX cinch ring crimper	1:5
45. PVC Hand saw	1:5
46. Flaring tool kit	1:5
47. Offset pipe wrench 14"	1:5
48. Strap wrench	1:5
49. Basin wrench / telescopic	1:5
50. Pipe extractors	1:5
51. Plastic tube cutter/ scissor type	1:5
52. Faucet seat extractor	1:5
53. Faucet handle puller	1:5
54. Sink plunger	1:5
55. Plunger	1:5
56. PO wrench	1:5
57. Reciprocating saw	1:5
58. Hammer drill	1:5
59. Welding equipment	1:5
60. Generator	1:25
61. Teflon Tape	1:25
62. 50/50 solder	As required
63. Flux soldering paste	As required

64. Silicone	As required
65. Lead free solder	As required
66. Sand cloth	As required
67. Gasket material	As required
68. Fitting brush	As required
69. Copper strapping	As required
70. Plumbers putty	As required
71. Equipment manufacturer`s manual	1:5

REFERENCES

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SECTOR	**CONSTRUCTION (F)**						
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**						
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**						
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**						
COMPETENCY UNIT TITLE	**WATER TANK INSTALLATION**						
PRE-REQUISITE (If Applicable)							
LEARNING OUTCOME	The person who is competent in this CU shall be able to perform water tank installation as per requirements. Upon completion of this competency units, trainees will be able to:- 1. Interpret water tank installation drawing 2. Select water tank type 3. Prepare water tank base 4. Perform water tank and accessories installation 5. Carry out water tank testing						
COMPETENCY UNIT ID	F432-002-2: 2017 C05	**LEVEL**	2	**TRAINING DURATION**	84 Hours	**SKILL CREDIT**	8

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
1. Interpret Water Tank Installation Drawing	1.1 Purpose of water tank installation drawing 1.2 Water tank specification 1.3 Water tank component • Ball valve • Inlet pipe • Outlet pipe • Scour pipe • Overflow pipe	1.1 Interpret water tank installation drawing 1.2 Identify type of tank 1.3 Identify tank detail connection	ATTITUDE • Precise in identifying installation drawing • Detailed and precise in selecting technique	Related Knowledge 2 Related Skill 4	Related Knowledge Lecture Related Skill Demonstration and Observation	1.1 Water tank installation drawing interpreted to determine location, connection details and installation pipes are done according to UTG requirement 1.2 Types of tank to be used is

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Warning pipe 1.4 Purpose of Uniform Technical Guideline (UTG) for water tank installation					identified according to drawing, technical specification and approved by accreditation body 1.3 Tank detail connection determine according to installation drawing and UTG requirements
2. Select Water Tank Type	2.1 Type and usage of water tank 2.2 Water tank design capacity • storage • shape • dimension 2.3 Type of water tank materials • High Density Polyethylene (HDPE) • Fibre Glass (fibre glass reinforced polyester	2.1 Determine design capacity 2.2 Determine type of storage tank 2.3 Determine type of water tank material 2.4 Determine installation location 2.5 Select water tank as per installation requirement	ATTITUDE • Precise in determine design capacity • Detailed and precise in selecting type	Related Knowledge 2 Related Skill 4	Related Knowledge Lecture Related Skill Demonstration and Observation	2.1 Capacity of water tank is determined according to design consumption as approved by accreditation body 2.2 Type storage tank selected according to design drawing to fulfil water demand requirement and approved by

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	(FRP) • Glass reinforced polyester (GRP) • Stainless steel • Reinforced Concrete tank • Hot dipped Galvanised steel • Aluminium • PVC 2.4 Water tank installation location • Outdoor • Indoor					accreditation body 2.3 Installation location determined according to drawing and environmental requirement
3. Prepare Water Tank Base	3.1 Type and usage of water tank construction PPE 3.2 Type and usage of tank base • Steel plate • Timber • Concrete base	3.1 Wear proper PPE 3.2 Interpret water tank drawing 3.3 Determine Tank capacity 3.4 Select type of tank base 3.5 Construct tank base	ATTITUDE • Precise in determine capacity • Detailed and precise in selecting base material	Related Knowledge 2 Related Skill 4	Related Knowledge Lecture Related Skill Demonstration and Observation	3.1 Proper PPE listed out and explained 3.2 Water tank capacity confirmed according to drawing and minimum capacity approved by accreditation body 3.3 Tank base

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Steel Channel 3.3 Tank base specification 3.4 Tank base construction procedure 3.5 Tank base construction safety and regulation		<u>SAFETY</u> • Adhere to safety procedures and guidelines • Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			material selected to cater for design load 3.4 Tank base prepared according to construction drawing in the work requirement
4. Perform Water Tank And Accessories Installation	4.1 Type and usage of water tank jointing material 4.2 Connection pipes and fitting installation specification 4.3 Connection pipes and fitting installation procedure	4.1 Select jointing material 4.2 Install connection pipes 4.3 Install connection fittings 4.4 Install valves 4.5 Install water tank	<u>ATTITUDE</u> • Precise in selecting jointing material • Detailed and precise in method and procedure <u>SAFETY</u> • Adhere to	<u>Related Knowledge</u> 14 <u>Related Skill</u> 34	<u>Related Knowledge</u> Lecture <u>Related Skill</u> Demonstration and Observation	4.1 Proper type Jointing materials listed out and explained 4.2 Pipe, fitting and valves connected as per drawing to ensure functionality in the system 4.3 Water tank and

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	4.4 Type and usage of valves • ball valve • altitude valve • gate valve 4.5 Valve installation procedure 4.6 Type and usage of water tank accessories • cover • air vent • inspection opening • ladder • level indicator • strainer 4.7 Water tank installation procedure 4.8 Format of water tank installation checklist	4.6 Install tank accessories 4.7 Complete water tank installation checklist	safety procedures and guidelines • Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			tank cover installed according to drawing and UTG 4.4 Manpower complied with safety rules and regulation according to safety, health and environmental to avoid injuries, instrument damage and pollution. 4.5 Work area, tools and equipment cleaned from dirt and properly kept according housekeeping and safety practices 4.6 Water tank installation check list completed to ensure water tank installation is done according to design drawing and requirement

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
5. Carry Out Water Tank Testing	5.1 Purpose of water tightness test 5.2 Type and usage of water tightness test tools and equipment 5.3 Water tightness test procedure 5.4 Purpose of leakage test 5.5 Type and usage of leakage test tools and equipment 5.6 Leakage test procedure 5.7 Water tank testing report format	5.1 Interpret construction drawing 5.2 Interpret work instruction 5.3 Check water tank testing location 5.4 Identify source of water supply 5.5 Prepare testing tools and equipment 5.6 Carry out water tightness test 5.7 Carry out leakage test 5.8 Record water tank testing results 5.9 Prepare water tank testing report 5.10 Submit water tank testing report	ATTITUDE • Precise in determine Water tightness test • Detailed and precise in reporting SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices	Related Knowledge 2 Related Skill 10	Related Knowledge Lecture, Related Skill Demonstration and Observation	5.1 Construction drawing interpreted to determine dimension, capacity, type and class of water tank 5.2 Work instruction interpreted to determine scope of work and method statement to be used for leakage testing 5.3 Location of water tank test checked to mobilise testing tools and equipment 5.4 Source of water to be identified and prepared for connection to water tank to be tested 5.5 Tools and equipment prepared to enable facilitate

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						leakage testing of the water tank 5.6 Leakage test carried out according to standard testing procedure and specification. 5.7 Leakage test results are recorded in standard form as required by standard testing procedure and specification 5.8 Water tank installation report prepared at required time according to report format 5.9 Water tightness Test report prepared at required time according to report format 5.10 All reports are compiled based

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						on report type according to standard filing system

Employability Skills

CORE ABILITIES	SOCIAL SKILLS
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 02.05 Read/Interpret flowcharts and pictorial information. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.04 Seek and act constructively upon feedback about work performance. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

TOOLS, EQUIPMENT AND MATERIALS (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Tape Measure	1:1
2. Multi tip screw driver	1:1
3. Vise grip pliers	1:1
4. Allen keys	1:1
5. Shovels, long/short	1:5
6. Safety gloves	1:1
7. Goggles	1:1
8. Ear Plug	1:1
9. Trowel	1:1
10. Claw hammer	1:5
11. Ball peen hammer	1:5
12. Side cutters	1:5
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15. Sledge hammer	1:5
16. Hand saw	1:5
17. Hack saw	1:5
18. Regular screw driver	1:5
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56. PO wrench	1:5
57. Reciprocating saw	1:5
58. Hammer drill	1:5
59. Welding equipment	1:5
60. Generator	1:25
61. Teflon Tape	1:25
62. 50/50 solder	As required
63. Flux soldering paste	As required

64. Silicone	As required
65. Lead free solder	As required
66. Sand cloth	As required
67. Gasket material	As required
68. Fitting brush	As required
69. Copper strapping	As required
70. Plumbers putty	As required
71. Equipment manufacturer`s manual	1:5

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4. Peter Smith (2004) Piping Materials Guide, Published: 1st December 2004, Publisher: Elsevier Science & Technology , Country of Publication: GB, ISBN: 9780750677431
5. Peter Wenning (2010) Basic Plumbing Services Skills - Sanitary/Drainage , First Edition, Published: 10th May 2010, Publisher: Pearson Education Australia ISBN: 9781442508668
6. Tafe NSW (2013) Basic Plumbing Services Skills : Water Supply , Second Edition, Published: 16th October 2012Publisher: Pearson Education Australia , ISBN: 9781442552364
7. Home Depot (2005) Plumbing 1-2-3 Hardcover – September 13, 2005, Publisher: The Home Depot; 2 edition (September 13, 2005) ISBN-13: 978-0696222474
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10. Baniel Riordan (2013), Technical Report Writing Today 10th Edition, Publisher: Cengage Learning;ISBN-13: 978-1133607380

SECTOR	**CONSTRUCTION (F)**						
SUB SECTOR	**PLUMBING AND OTHER CONSTRUCTION INSTALLATION ACTIVITIES (43)**						
JOB AREA	**INSTALLATION OF PLUMBING AND SANITARY EQUIPMENT**						
NOSS TITLE	**PLUMBING AND SANITARY INSTALLATION OPERATION**						
COMPETENCY UNIT TITLE	**PLUMBING AND SANITARY MAINTENANCE WORKS**						
PRE-REQUISITE (If Applicable)							
LEARNING OUTCOME	The person who is competent in this CU shall be able to perform plumbing and sanitary maintenance works as per requirements. Upon completion of this competency units, trainees will be able to:- 1. Carry out water pipe maintenance work 2. Carry out water tank maintenance work 3. Carry out sanitary and waste pipe maintenance work 4. Carry out plumbing and sanitary fixture maintenance work 5. Generate maintenance report						
COMPETENCY UNIT ID	F432-002-2: 2017 C06	**LEVEL**	2	**TRAINING DURATION**	96 Hours	**SKILL CREDIT**	10

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
1. Carry Out Water Pipe Maintenance	1.1 Purpose of As Built drawing 1.2 As Built drawing specification 1.3 Type and scope of water pipe maintenance • Preventive • Corrective 1.4 Type of faulty	1.1 Identify faulty or leaking pipes 1.2 Interpret as built drawing 1.3 Prepare pipe maintenance tools and materials 1.4 Isolate water supply 1.5 Repair minor	ATTITUDE • Meticulous and precise in maintenance report format • Systematic in preparing maintenance report • Time conscious in completing	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture Related Skill Demonstration and Observation	1.1 Faulty or leaking pipe identified by visual inspection upon receiving work instruction 1.2 As built drawing interpreted to locate pipe alignment for leakage detection 1.3 Required tools and materials prepared as per job

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	or leaking pipes • Joint leak • Pipe failure • Damage fitting 1.5 Type and usage of water pipe maintenance tools and materials 1.6 Water pipe maintenance procedure	defects 1.6 Replace defective water piping 1.7 Check leakage on completed work	SAFETY • Adhere to safety procedures and guidelines • Use correct PPE ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			requirement 1.4 Water Supply isolated to assist repair or replacement of leaking/defective pipe 1.5 Repair works carried out on minor defect 1.6 Pipe replaced on major defect 1.7 Visual check carried out on leakages that have been rectified based on work instruction
2. Carry Out Water Tank Maintenance	2.1 Type and scope of water tank maintenance • Preventive • Corrective 2.2 Type of faulty or leaking water tank • Tank panel leak	2.1 Identify water tank maintenance requirement 2.2 Interpret as built drawing 2.3 Prepare water tank maintenance tools and materials	ATTITUDE • Meticulous and precise in maintenance report format • Systematic in preparing maintenance report • Time conscious in completing	Related Knowledge 6 Related Skill 12	Related Knowledge Lecture Related Skill Demonstration and Observation	2.1 Leaking and damaged water tank identified by visual inspection upon receiving work instruction 2.2 Inlet valve to be checked to identify the source of water supply interruption to water tank

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Tank connection leak • Damage fitting • Valve • Corrosion • Bulging 2.3 Type and usage of water tank maintenance tools and materials 2.4 Water tank maintenance procedure	2.4 Isolate water supply 2.5 Clean water tank 2.6 Repair minor defects 2.7 Replace defective water tank and component 2.8 Check leakage on completed work	<u>SAFETY</u> • Adhere to safety procedures and guidelines • Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			2.3 As built drawing referred to locate leakage, damage or choked valve for detection 2.4 Required tools and materials prepared as per job requirement 2.5 Water Supply isolated to assist repair or replacement of leaking/defective water tank 2.6 Repair works to be carried out on minor defect whereas replacement will be done on major defect 2.7 Tank cleaning work carried out upon completion of repair or replacement work to ensure the treated water quality conform to MOH requirement

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
						2.8 Visual check carried out on completed repair or replacement works based on work instruction
3. Carry Out Sanitary And Waste Pipe Maintenance	3.1 Type and scope of sanitary and waste pipe maintenance • Preventive • Corrective 3.2 Type of faulty or leaking pipes • Joint leak • Pipe failure • Damage Fitting • Blockage 3.3 Type and usage of sanitary and waste pipe tools and materials 3.4 Sanitary and waste pipe	3.1 Identify sanitary and waste pipe maintenance requirement 3.2 Interpret as built drawing 3.3 Prepare sanitary and waste pipe maintenance tools and materials 3.4 Isolate water supply 3.5 Place work in progress signage 3.6 Repair minor defects 3.7 Replace defective sanitary	<u>ATTITUDE</u> • Meticulous and precise in maintenance report format • Systematic in preparing maintenance report • Time conscious in completing task <u>SAFETY</u> • Adhere to safety procedures and guidelines • Use correct PPE <u>ENVIRONMENT</u>	<u>Related Knowledge</u> 6 <u>Related Skill</u> 18	<u>Related Knowledge</u> Lecture <u>Related Skill</u> Demonstration and Observation	3.1 Faulty or leaking pipe identified by visual inspection upon receiving work instruction 3.2 As built drawing referred to locate pipe alignment for leakage detection 3.3 Required tools and materials prepared as per job requirement 3.4 Usage of faulty waste pipe line terminated to assist repair or replacement of leaking/defective section 3.5 Repair works to be carried out on minor defect whereas

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	maintenance procedure 3.5 Flushing work procedure	&waste pipe and component 3.8 Carry out flushing work 3.9 Check leakage on completed work	• Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices			replacement will be done on major defect 3.6 Waste pipe flushing works carried out upon completion of repair or replacement work to ensure smooth flow of effluent 3.7 Visual check carried out on leakages that have been rectified based on work instruction
4. Carry Out Plumbing And Sanitary Fixture Maintenance	4.1 Type and scope of plumbing and sanitary fixture maintenance • Preventive • Corrective 4.2 Type of faulty plumbing and sanitary fixture • Joint leak • Pipe failure • Damaged Fitting	4.1 Identify plumbing and sanitary fixture maintenance requirement 4.2 Interpret as built drawing 4.3 Prepare plumbing and sanitary fixture maintenance tools and materials 4.4 Isolate water	ATTITUDE • Meticulous and precise in maintenance report format • Systematic in preparing maintenance report • Time conscious in completing task SAFETY	Related Knowledge 6 Related Skill 18	Related Knowledge Lecture Related Skill Demonstration and Observation	4.1 Faulty or leaking sanitary fixture identified by visual inspection upon receiving work instruction 4.2 Manufacturer's manual referred to acquire correct information on repair works procedure 4.3 Required tools and materials prepared

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
	• Damaged sanitary fixture • Component malfunction 4.3 Type and usage plumbing and sanitary fixture tools and materials 4.4 plumbing and sanitary fixture maintenance procedure	supply 4.5 Place work in progress signage 4.6 Repair minor defects 4.7 Replace defective plumbing and sanitary fixture 4.8 Carry out flushing work 4.9 Check leakage on completed work	• Adhere to safety procedures and guidelines • Use correct PPE <u>ENVIRONMENT</u> • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices •			as per job requirement 4.4 Water Supply isolated by shutting off valve to assist repair or replacement of faulty sanitary fixture 4.5 Repair works to be carried out on minor defect whereas replacement will be done on major defect 4.6 Visual check carried out on completed work that have been rectified based on work instruction

WORK ACTIVITIES	RELATED KNOWLEDGE	RELATED SKILL	ATTITUDE/ SAFETY/ ENVIRONMENT	TRAINING HOURS	DELIVERY MODE	ASSESSMENT CRITERIA
5. Generate Maintenance Report	5.1 Maintenance report format 5.2 Maintenance report content 5.3 Maintenance reporting procedure	5.1 Prepare Water pipe Maintenance report 5.2 Prepare water tank maintenance report 5.3 Prepare sanitary and waste pipe maintenance report 5.4 Compile maintenance report 5.5 Submit maintenance report	ATTITUDE • Meticulous and precise in maintenance report format • Systematic in preparing maintenance report • Time conscious in completing task SAFETY • Adhere to safety procedures and guidelines ENVIRONMENT • Adhere to Department Of Environment requirements • Adhere to 3R's (Reduce, Reuse and Recycle) practices	Related Knowledge 2 Related Skill 4	Related Knowledge Lecture Related Skill Demonstration and Observation	5.1 Water pipe maintenance report prepared at required time according to report format 5.2 Water tank maintenance report prepared at required time according to report format 5.3 Sanitary and waste pipe maintenance report prepared at required time according to report format 5.4 Sanitary fixtures maintenance report prepared at required time according to report format 5.5 Reports are compiled based on report type according to standard filing system

EMPLOYABILITY SKILLS

CORE ABILITIES	SOCIAL SKILLS
01.01 Identify and gather information. 01.02 Document information procedures or processes. 02.01 Interpret and follow manuals, instructions and SOP's. 02.02 Follow telephone/telecommunication procedures. 02.03 Communicate clearly. 02.04 Prepare brief reports and checklist using standard forms. 02.05 Read/Interpret flowcharts and pictorial information. 03.01 Apply cultural requirement to the workplace. 03.02 Demonstrate integrity and apply practical practices. 03.03 Accept responsibility for own work and work area. 03.04 Seek and act constructively upon feedback about work performance. 03.05 Demonstrate safety skills. 03.06 Respond appropriately to people and situations. 03.07 Resolve interpersonal conflicts. 06.01 Understand systems. 06.02 Comply with and follow chain of command. 06.03 Identify and highlight problems. 06.04 Adapt competencies to new situations/systems. 03.08 Develop and maintain a cooperation within work group. 04.01 Organize own work activities. 04.03 Organize and maintain own workplace. 04.04 Apply problem solving strategies. 04.05 Demonstrate initiative and flexibility.	1. Communication skills 2. Conceptual skills 3. Interpersonal skills 4. Learning skills 5. Leadership skills 6. Multitasking and prioritising 7. Self-discipline 8. Teamwork

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TOOLS, EQUIPMENT AND MATERIALS (TEM)

ITEMS	RATIO (TEM : Trainees)
1. Tape Measure	1:1
2. Multi tip screw driver	1:1
3. Vise grip pliers	1:1
4. Allen keys	1:1
5. Shovels, long/short	1:5
6. Safety gloves	1:1
7. Goggles	1:1
8. Ear Plug	1:1
9. Trowel	1:1
10. Claw hammer	1:5
11. Ball peen hammer	1:5
12. Side cutters	1:5
13. Socket set	1:5
14. Tin snips	1:5
15. Sledge hammer	1:5
16. Hand saw	1:5
17. Hack saw	1:5
18. Regular screw driver	1:5
19. Stubby screw drivers	1:5
20. Cold/wood chisel	1:5
21. Step ladder	1:5
22. Flash light	1:5
23. Hole saw kit	1:5
24. Various adjustable wrenches	1:5
25. Needle-nose pliers	1:5
26. Crow bar	1:5
27. Caulking gun	1:5
28. Drywall knife	1:5
29. Box cutter	1:5
30. Wire strippers	1:5

31. Mini pipe cutter	1:5
32. PEX Crimpers	1:5
33. Steel pipe cutter	1:5
34. Spud wrench	1:5
35. Pipe wrenches 6”/10”/14”/18”/24”	1:5
36. Offset hex wrench	1:5
37. Cast iron snap cutter	1:5
38. Torpedo level	1:5
39. Pipe tapping tools	1:5
40. Internal pipe wrench	1:5
41. Internal pipe cutter	1:5
42. Pipe reamer	1:5
43. Medium copper pipe cutter 2"	1:5
44. PEX cinch ring crimper	1:5
45. PVC Hand saw	1:5
46. Flaring tool kit	1:5
47. Offset pipe wrench 14"	1:5
48. Strap wrench	1:5
49. Basin wrench / telescopic	1:5
50. Pipe extractors	1:5
51. Plastic tube cutter/ scissor type	1:5
52. Faucet seat extractor	1:5
53. Faucet handle puller	1:5
54. Sink plunger	1:5
55. Plunger	1:5
56. PO wrench	1:5
57. Reciprocating saw	1:5
58. Hammer drill	1:5
59. Welding equipment	1:5
60. Generator	1:25
61. Teflon Tape	1:25
62. 50/50 solder	As required
63. Flux soldering paste	As required

64. Silicone	As required
65. Lead free solder	As required
66. Sand cloth	As required
67. Gasket material	As required
68. Fitting brush	As required
69. Copper strapping	As required
70. Plumbers putty	As required
71. Equipment manufacturer`s manual	1:5

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21. TRAINING HOUR SUMMARY

CU CODE	COMPETENCY UNIT TITLE	WORK ACTIVITIES	RELATED KNOWLEDGE (A)	RELATED SKILL (B)	HOURS (C) = (A)+(B)	TOTAL (HOURS) ∑(C)
F432-002-2: 2017 C01	Plumbing and Sanitary Technical Drawing Preparation	Prepare Plumbing Drawing	6	24	30	105
		Prepare Sanitary Drawing	6	18	24	
		Prepare Waste Pipe Drawing	6	18	24	
		Prepare construction drawings	6	18	24	
		Compile plumbing and sanitary drawing	1	2	3	
F432-002-2: 2017 C02	Plumbing and Sanitary Works Preparation	Determine work position and location	6	12	28	106
		Prepare water pipe tools and equipment	6	6	12	
		Prepare waste pipe tool and equipment	6	6	12	
		Request piping material	18	12	30	
		Carry out material storage	6	6	12	
		Carry out tools and equipment storage	3	9	12	
F432-002-2: 2017 C03	Water Pipe Installation	Interpret work instruction	1	1	2	314
		Determine water pipe installation requirement	4	2	6	
		Select pipe material	40	20	60	
		Perform water pipe setting out	12	48	60	
		Perform water pipe and fitting installation	30	102	132	
		Carry out water pipe pressure Test	6	18	24	
		Carry out water pipe leakage Test	6	18	24	
		Prepare pipe Installation and Test Reports	3	3	6	
F432-	Waste Pipe	Interpret work instruction	3	6	9	347

002-2: 2017 C04	Installation	Determine waste pipe installation requirement	4	2	6	
		Select pipe material	30	18	48	
		Perform waste pipe setting out	6	18	24	
		Perform waste pipe and fitting installation	18	36	54	
		Perform sanitary pipe and fitting installation	12	36	48	
		Perform sanitary appliances installation	30	54	74	
		Perform waste trap installation	12	30	42	
		Carry out waste pipe Test	6	18	24	
		Prepare Installation and Testing Report	6	12	18	
F432-002-2: 2017 C05	Water Tank Installation	Interpret water tank installation drawing	2	4	6	84
		Select water tank type	2	4	6	
		Prepare water tank base	2	4	6	
		Perform water tank and accessories installation	14	34	48	
		Carry out water tank testing	2	10	12	
F432-002-2: 2017 C06	Plumbing and Sanitary Maintenance Works	Carry out water pipe maintenance work	6	18	24	96
		Carry out water tank maintenance work	6	12	18	
		Carry out sanitary and waste pipe maintenance work	6	18	24	
		Carry out plumbing and sanitary fixture maintenance work	6	18	24	
		Generate maintenance report	2	4	6	
TOTAL HOURS (CORE COMPETENCY)			349	703		**1052**