



Curriculum Document				
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642601000	National Occupational Qualification: Plumber (General)			
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## SECTION 1: CURRICULUM OVERVIEW

### 1 NOPF Information

#### 1.1 Occupational Cluster

XXXXX

#### 1.2 Occupational Field

Xxxxx

### 2 Occupational Information

#### 2.1 Related Occupation

Xxxxx

#### 2.2 Occupation or Specialisation Addressed by this Curriculum

642601: Plumber (General)

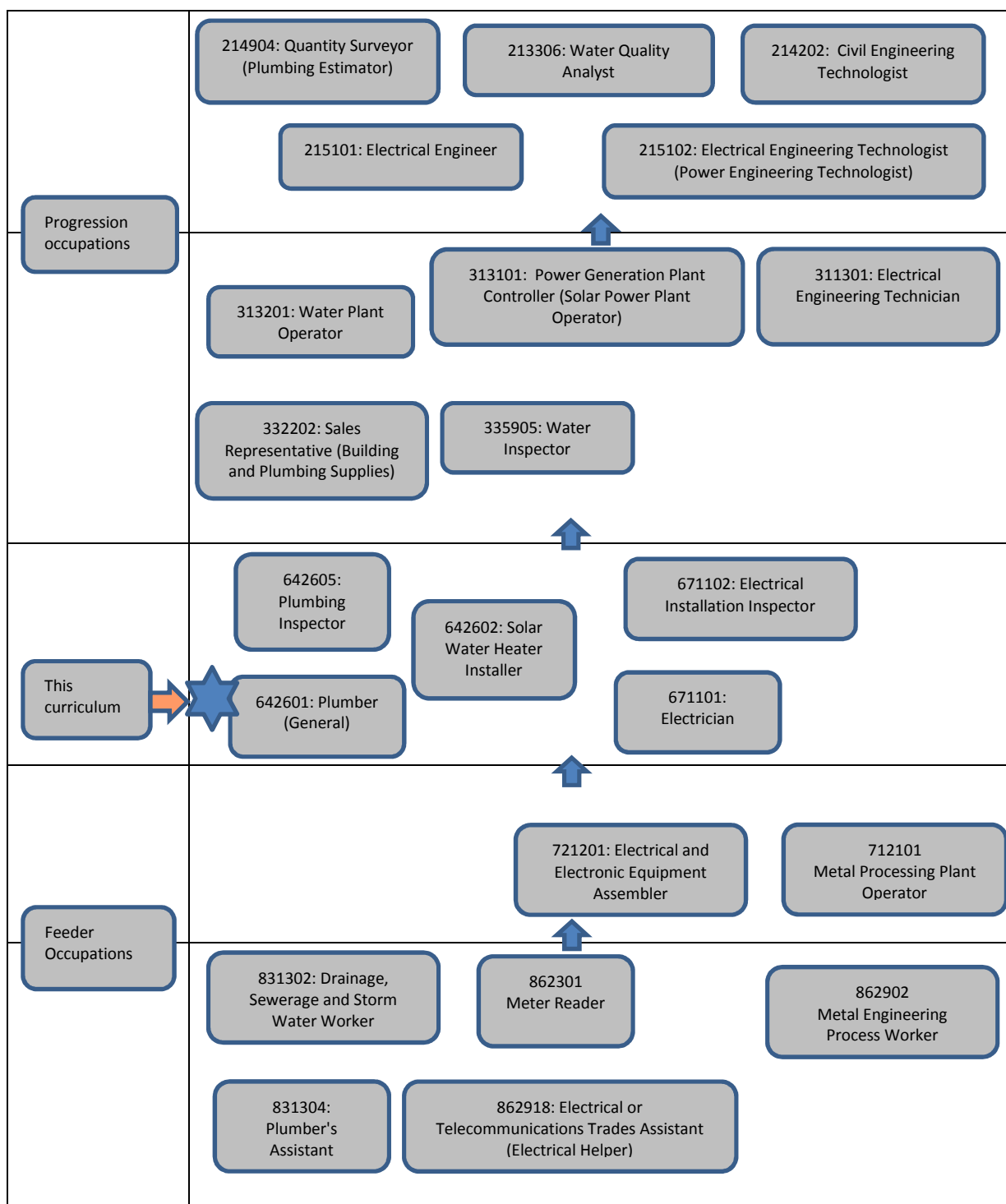
#### 2.3 Alternative Titles used by Industry

None

### 3 Curriculum Information

#### 3.1 Relation of this Curriculum to the Occupation and Occupational Progression

- 214904: Quantity Surveyor (Plumbing Estimator); 213306: Water Quality Analyst; 214202 Civil Engineering Technologist;
- 332202: Sales Representative (Building and Plumbing Supplies); 313201: Water Plant Operator; 335905: Water Inspector; 311301: Electrical Engineering Technician
- 642601: Plumber (General); 642605: Plumbing Inspector; 671101: 642602: Solar Water Heater Installer; 642606: Heat Pump Installer
- 721201: Electrical and Electronic Equipment Assembler  
831302: Drainage, Sewerage and Storm Water Worker; 831304: Plumber's Assistant;



### 3.2 Curriculum Structure

Subjects					
Number		Title		NQF Level	Credits
642601000_KS_01		Plumbing Trade Theory		4	100
Total Knowledge Credits					
Practical Skills Modules					
Number		Title		NQF Level	Credits
642601000_PS_01		Install, maintain and test above ground soil waste and vent systems and sanitaryware appliances		4	30
642601000_PS_02		Install, maintain and test below-ground drainage systems		4	35
642601000_PS_03		Install, maintain and test cold water and hot water systems		4	35
642601000_PS_04		Install, maintain and test rain water systems		4	30
Total Practical Credits					130
Work Experience Modules					
Number		Title		NQF Level	Credits
642601000_WE_01		Processes and procedures for installation and testing of above ground soil waste and vent systems and sanitaryware appliances		4	30
642601000_WE_02		Processes and procedures for installation and testing of below-ground drainage systems and performing basic building work		4	35
642601000_WE_03		Procedures and processes for installation and maintenance of cold water and hot water systems		4	35
642601000_WE_04		Procedures and processes for installation and maintenance of rain water systems		4	30
Total Workplace Credits					130
Total Qualification Credits					360
Knowledge Credits:		100	Practical Credits:	130	Workplace Credits: 130



### **3.3 International Comparability**

“Water runs down Hill” and this is the same throughout the world. Similar the physical application or the hands on of plumbing though out the world is the same. The physical application or installations of plumbing in buildings throughout the world is the same, which is clearly highlighted in this international comparability study. Extensive research and benchmarking was undertaken which included the two best practice countries of England and Australia.

#### **England:**

In England they have developed a suite of Qualifications for plumbers of all specialities. These include:

- Level 2 Certificate in basic Plumbing studies.

This provides the learner with the knowledge and understanding needed to complete a Level 2 NVQ. They will learn about key plumbing principles and the theory of areas such as hot and cold water systems, sanitation systems, central heating systems (pipe work), and electrical supply and safety. Assessment is via multiple choice examination and practical tests. A total of 495 learning hours are recommended for this award.

- Level 2 NVQ in Plumbing.

Candidates will need to demonstrate their competence in six mandatory areas:

- Maintaining a safe working environment.
- Maintaining effective working relationships.
- Contributing to improvement of the work environment.
- Install non-complex plumbing systems and components.
- Decommission non-complex plumbing systems.
- Maintain non-complex plumbing systems and components.
- Level 3 Certificate in Plumbing Studies.

This provides the learner with the knowledge and understanding needed to complete the Level 3 NVQ. They will learn about systems planning, complex cold water, domestic hot water and sanitation systems, central heating systems, domestic gas supply systems and improving business products and services. Assessment is by multiple choice question papers and practical tasks.

- Level 3 NVQ in Plumbing.

Candidates will need to demonstrate their competencies in the first two units of the Level 2 NVQ plus:

- Contribute to the improvement plumbing products and services.
- Plan complex domestic plumbing work activities.
- Install complex domestic plumbing systems.
- Commission and decommission complex domestic plumbing systems.
- Service and maintain complex domestic plumbing systems and components.

Learners can articulate horizontally through Levels 2 and 3 NVQ Heating and Ventilating, Levels 2 and 3 in Domestic Natural Gas Installation and Maintenance and Levels 2 and 3 Technical Studies. Learners are also able to articulate vertically through Levels 3 and 4 Introductory Award for Owner Managers.

### **Australia:**

Qualification Structure and Rules:

To be awarded the Certificate III in Plumbing qualification, candidates must achieve a minimum of four of the following plumbing streams:

- Stream 1 - Water (Mandatory).
- Stream 2 - Sanitary.
- Stream 3 - Drainage.
- Stream 4 - Mechanical Services.
- Stream 5 - Roofing.
- Stream 6 - Gas Services.

Individual competency units gained in one qualification or sub-sector stream may also be used as a credit for any other qualification or sub-sector in which the unit is listed in the table as either a core or elective.

The rules for each of these individual streams are shown in the following pages:

- Plumbing Stream 1 - Water. This is a mandatory requirement. To obtain this stream all twenty-four (24) core competency units and six (6) elective competency units from the following table must be achieved:

Core:

- BCPCM2001A; Work effectively in the plumbing and services sector.
- BCPCM2002A; Carry out interactive workplace communication.

- BCPCM2003A; Carry out OH&S requirements.
- BCPCM2004A; Read plans and calculate plumbing quantities.
- BCPCM2005A; Handle and store plumbing materials.
- BCPCM2006A; Use plumbing hand and power tools.
- BCPCM2007A; Carry out levelling.
- BCPCM2010A; Mark out materials.
- BCPCM2011A; Apply first aid in the workplace.
- BCPCM2012A; Weld using oxy-acetylene equipment.
- BCPCM2013A; Weld using arc welding equipment.
- BCPCM3001A; Flash penetrations through roofs and walls.
- BCPCM3002A; Weld polyethylene (PE) pipe using fusion method.
- BCPCM3003A; Fabricate and install non-ferrous pressure piping.
- BCPFS3001A; Fabricate and install fire hydrant and hose reel systems.
- BCPFS3007A; Install domestic and residential life safety sprinkler systems.
- BCPRF2001A; Work safely on roofs.
- BCPWT3001A; Set out and install water services.
- BCPWT3002A; Install and adjust water service controls and devices.
- BCPWT3003A; Install and commission water heating systems.
- BCPWT3005A; Install water pump sets.
- BCPWT3006A; Fit off and commission hot and cold water services.
- BCPWT3007A; Connect irrigation systems from drinking water supply.
- BCGCO2003B; Carry out concreting to simple forms.

Elective:

- BCPCM2008A; Cut and join sheet metal.
- BCPCM2009A; Cut with oxy-LPG acetylene.
- BCPFS2001A; Connect static storage tanks.
- BCPFS2002A; Install portable fire equipment.
- BCPFS3003A; Fit off sprinkler heads, controls and ancillary equipment.
- BCPFS3004A; Install control valve assemblies, actuating devices and local alarms.
- BCPFS3008A; Test and maintain fire hydrant and hose reel installations.
- BCPIG2001A; Design domestic urban irrigation systems.
- BCPIG3001A; Set out, install and commission irrigation systems.
- BCPIG3002A; Install and commission domestic irrigation pumps.

- BCPMS3001A; Fabricate and install steel pressure piping.
  - BCPMS3002A; Select and fit insulation and sheathing.
  - BCPMS3003A; Install small bore heating systems.
  - BCPMS3010A; Install and maintain evaporative air cooling systems.
  - BCPRF2003A; Collect and store roof water.
  - BCPWT3004A; Install domestic water treatment equipment.
  - BCPWT3008A; Install water service.
  - BCCPL3001B; Install water mains pipelines.
  - BCF2009A; Carry out load slinging of off-site materials.
  - BCGCM2003B; Install trench support.
  - BCGCM2008B; Erect and dismantle restricted height scaffolding.
  - BCGCM3001B; Operate elevated work platforms.
  - BCGR13001B; Operate personnel and materials hoists.
  - BCGWC3006B; Install acoustic and thermal environmental protection systems.
  - MEM5.49AA; Perform routine gas tungsten arc welding.
  - MEM5.50AA; Perform routine gas metal arc welding.
  - RTE3605A; Troubleshoot faults and blockages in irrigation systems.
- Plumbing Stream 2 - Sanitary. To obtain this stream all six (6) core competency units and four (4) elective competency units from the following table must be achieved:

Core:

- BCPCM2008A; Cut and join sheet metal.
- BCPDR2001A; Locate and clear blockages.
- BCPSN3001A; Plan the layout for a residential sanitary plumbing system.
- BCPSN3002A; Install discharge pipes.
- BCPSN3003A; Fabricate and install sanitary stacks.
- BCPSN3004A; Install and fit off sanitary fixtures.

Elective:

- BCPCM2009A; Cut with oxy-LPG acetylene.
- BCPDR2002A; Install domestic treatment plants.
- BCPDR2003A; Maintain effluent disinfection system.
- BCPDR2004A; Install stormwater and sub-soil drainage systems.

- BCPDR2005A; Drain worksite.
  - BCPDR2006A; Install pre-fabricated inspection openings and enclosures.
  - BCPDR3002A; Install below ground sanitary drainage systems.
  - BCPDR3003A; Install on-site disposal systems.
  - BCPMS3002A; Select and fit insulation and sheathing. BCPSN3005A; Install pre-treatment facilities.
  - BCPSN3006A; Install sewerage pump sets.
  - BCF2009A; Carry out load slinging of off-site materials.
  - BCGCM2003B; Install trench support.
  - BCGCM2008B; Erect and dismantle restricted height scaffolding.
  - BCGCM3001B; Operate elevated work platforms.
  - BCGR13001B; Operate personnel and material hoists.
  - BCGWC3006B; Install acoustic and thermal environmental protection systems.
- Plumbing Stream 3 - Drainage. To obtain this stream all nine (9) core competency units and three (3) elective competency units from the following table must be achieved:

Core:

- BCPDR2001A; Locate and clear blockages.
- BCPDR2002A; Install domestic treatment plants.
- BCPDR2004A; Install stormwater and sub-soil drainage systems.
- BCPDR2005A; Drain worksite.
- BCPDR2006A; Install pre-fabricated inspection openings and enclosures.
- BCPDR3001A; Plan the layout for a residential sanitary drainage system.
- BCPDR3002A; Install below ground sanitary drainage systems.
- BCPDR3003A; Install on-site disposal systems.
- BCGCM2003B; Install trench support.

Elective:

- BCPCM2008A; Cut and join sheet metal.
- BCPCM2009A; Cut with oxy-LPG acetylene.
- BCPDR2003A; Maintain effluent disinfection systems.
- BCPSN3005A; Install pre-treatment facilities.
- BCCPL3001B; Install water mains pipelines.

- BCF2009A; Carry out load slinging of off-site materials.

Plumbing Stream 4 - Mechanical Services. To obtain this stream all four (4) core competency units and eleven (11) elective competency units from the following table must be achieved:

Core:

- BCPCM2008A; Cut and join sheet metal.
- BCPMS2001A; Assemble mechanical services components.
- BCPMS3001A; Fabricate and install steel pressure piping.
- BCPMS3003A; Install small bore heating systems.

Elective:

- BCPCM2009A; Cut with oxy-LPG acetylene.
- BCPMS3002A; Select and fit insulation and sheathing.
- BCPMS3004A; Install medical gas pipeline systems.
- BCPMS3005A; Install and test ducting systems.
- BCPMS3006A; Install air handling units.
- BCPMS3007A; Install split system air conditioning.
- BCPMS3008A; Install air conditioning control equipment.
- BCPMS3009A; Maintain mechanical services equipment.
- BCPMS3010A; Install and maintain evaporative air cooling systems.
- BCPRF3003A; Fabricate and install external flashings.
- BCF2009A; Carry out load slinging of off-site materials.
- BCGCM2003B; Install trench support.
- BCGCM2008B; Erect and dismantle restricted height scaffolding.
- BCGCM3001B; Operate elevated work platforms.
- BCGRI3001B; Operate personnel and material hoists.
- BCGWC3006B; Install acoustic and thermal environmental protection systems.
- MEM5.49AA; Perform routine gas tungsten arc welding.
- MEM5.50AA; Perform routine gas metal arc welding.
- MEM10.9AA; Install refrigeration and air conditioning plant and equipment.
- MEM10.10AA; Install pipework and pipework assemblies.
- MEM18.86AA; Test, evacuate and charge refrigeration systems.

- Plumbing Stream 5 - Roofing. To obtain this stream all nine (9) core competency units and four (4) elective competency units from the following table must be achieved:

Core:

- BCPCM2008A; Cut and join sheet metal.
- BCPRF2002A; Select and install roof sheeting and wall cladding.
- BCPRF2003A; Collect and store roof water.
- BCPRF3001A; Receive roofing materials.
- BCPRF3002A; Fabricate and install roof drainage components.
- BCPRF3003A; Fabricate and install external flashings.
- BCPRF3004A; Install roof components.
- BCPRF3005A; Install roof coverings to curved roof structures.
- BCPRF3006A; Install composite roof systems.

Elective:

- BCPCM2009A; Cut with oxy-LPG acetylene.
  - CPRF2004A; Fabricate roof coverings for curved structures.
  - BCF2009A; Carry out load slinging of off-site materials.
  - BCGCM2003B; Install trench support.
  - BCGCM2008B; Erect and dismantle restricted height scaffolding.
  - BCGCM3001B; Operate elevated work platforms.
  - BCGRI3001B; Operate personnel and material hoists.
  - BCGWC3006B; Install acoustic and thermal environmental protection systems.
  - MEM5.49AA; Perform routine gas tungsten arc welding.
  - MEM5.50AA; Perform routine gas metal arc welding.
- Plumbing Stream 6 - Gas Services. To obtain this stream all twelve (12) core competency units and five (5) elective competency units from the following table must be achieved:

Core:

- BCPCM2008A; Cut and join sheet metal.
- BCPGS3001A; Install gas piping systems.
- BCPGS3002A; Size consumer piping systems.
- BCPGS3003A; Install and commission Type A gas appliances.

- BCPGS3004A; Install LP gas storage of aggregate storage capacity up to 500 litres.
- BCPGS3006A; Install LP gas systems in caravans/mobile homes, watercraft and mobile work places.
- BCPGS3007A; Install gas detection devices.
- BCPGS3008A; Install gas pressure control equipment.
- BCPGS3009A; Install a Type A appliance flue.
- BCPGS3011A; Purge consumer piping.
- BCPGS3013A; Disconnect and reconnect Type A appliances.
- BCPGS3014A; Calculate and install natural ventilation for Type A gas appliances.

Elective:

- BCPCM2009A; Cut with oxy-LPG acetylene.
- BCPGS3005A; Install LP gas storage of aggregate capacity exceeding 500 litres and less than 8KL.
- BCPGS3010A; Install a Type B appliance flue.
- BCPGS3012A; Maintain Type A gas appliances.
- BCPGS3015A; Install subsidiary gas meters.
- BCPMS2001A; Assemble mechanical services components.
- BCPMS3001A; Fabricate and install steel pressure piping.
- BCPMS3003A; Install small bore heating systems.
- BCPMS3005A; Install and test ducting systems.
- BCPMS3006A; Install air handling units.
- BCF2009A; Carry out load slinging of off-site materials.
- BCGCM2003B; Install trench support.
- BCGCM2008B; Erect and dismantle restricted height scaffolding.
- BCGCM3001B; Operate elevated work platforms.
- BCGRI3001B; Operate personnel and material hoists.
- MEM5.49AA; Perform routine gas tungsten arc welding.
- MEM5.50AA; Perform routine gas metal arc welding.

A comprehensive comparison between the South African National Occupational Qualification: Plumber (NQF Level 4) and the Australian Certificate III in Plumbing was undertaken. The research was aided by a presentation by a delegate from the Australian plumbing industry and a subsequent benchmarking visit to Australia. The findings of this comparison were that the two qualifications were very similar with regard to the main occupational tasks and their standards with an exception of two competencies; these were basic electricity and basic welding. These were integrated into the unit standards with which they were directly



associated. With regards to the elective unit standards, plumbers in South Africa do not perform some of the tasks stipulated in the Australian model. These unit standards were identified and put aside.

While the physical application of plumbing may compare favourably to international standards, it must however be pointed out the South African Plumbing qualification does not address the relevant building/plumbing codes of practice for each of the aforementioned countries. While the qualification does address the relevant building/plumbing codes of practices for South Africa, it was felt that an international comparability was not necessary as it served no purpose as the aforementioned countries apply their own unique building/plumbing codes of practice. Barring the a countries unique building/plumbing codes of practice it is felt that the South African plumbing qualification compares favourably to international plumbing practices.

### **3.4 Entry Requirements**

National Certificate: Plumbing L2 (or equivalent); and Mathematical literacy at NQF Level 3; and Communication at NQF Level 3.

Or

Grade 12 with mathematics at NQF Level 4

Or

NCV NQF Level 3 with Mathematics and Science

Or

Grade 9 with Mathematics and Science; Plus N1, N2 Mathematics and Science

Or

FLC NQF Level 2

## **4 Assessment Quality Partner Information**

Name of body: National Artisan Moderating Body (NAMB)

Address of body: 123 Schoeman Street; PRETORIA; 0001

Contact person name: Nic Louw

Contact person work telephone number: Tel: 011 206 1015

## **5. Modules of Employable Skills (MES)**

1 642601ES00001: Drainlayer

2 642601ES00002: Hot water Installer

Modules of Employable Skill Title: Drainlayer				
<b>Purpose:</b> Install, maintain and test below ground drainage systems				
Number of Module	Knowledge Subjects	Practical Skill Module Number	Work Experience Module Number	Credits
642601ES00001	ST01; ST02; ST03; ST05	642601000_PS_02 PS01, PS02; PS03	642601000_WE_02 WE01; WE01	

Modules of Employable Skill Title: Hot water Installer				
<b>Purpose:</b> Install geysers and replace geysers				
Number of Module	Knowledge Subjects	Practical Skill Module Number	Work Experience Module Number	Credits
642601ES00002	ST15; ST17; ST19; ST21	642601000_PS_03 PS02; PS04; PS06	642601000_WE_03 WE02; WE03	

## SECTION 2: OCCUPATIONAL PROFILE

### 1 Occupational Purpose

The plumber installs, maintains, tests and repairs hot and cold water supply systems, drainage, sewerage and rainwater systems.

### 2 Occupational Tasks

1. Installing, maintaining, testing and repairing above ground soil waste and vent systems and sanitaryware appliances
2. Installing, maintaining and testing below-ground drainage systems and performing basic building work
3. Installing, maintaining and testing cold water systems and hot water systems
4. Installing, maintaining and testing rain water systems

### 3 Occupational Task Details

1. **Installing, maintaining, testing and repairing above ground soil waste and vent systems and sanitaryware appliances**

#### ***Unique Product or Service***

Operational and compliant above ground soil and waste drainages systems and sanitary appliances

#### ***Occupational Responsibilities***

Install, maintain and test above ground soil waste and vent systems and sanitaryware appliances

#### ***Occupational Contexts***

Processes and procedures for installation and testing of above ground soil waste and vent systems and sanitaryware appliances

2. **Installing, maintaining and testing below-ground drainage systems and performing basic building work**

#### ***Unique Product or Service***

Operational Below-ground drainage systems

#### ***Occupational Responsibilities***

Install, maintain and test below-ground drainage systems

***Occupational Contexts***

Processes and procedures for installation and testing of below-ground drainage systems and performing basic building work

**3. Installing, maintaining and testing cold water systems and hot water systems**

***Unique Product or Service***

Effective and operational cold and hot water systems

***Occupational Responsibilities***

Install, maintain and test cold water and hot water systems

***Occupational Contexts***

Procedures and processes for installation and maintenance of cold water and hot water systems

**4. Installing, maintaining and testing rain water systems**

***Unique Product or Service***

Effective and operational rain water systems

***Occupational Responsibilities***

Install, maintain and test rain water systems

***Occupational Contexts***

Procedures and processes for installation and maintenance of rain water systems

**SECTION 3: CURRICULUM COMPONENT SPECIFICATIONS**

**SECTION 3A: SUBJECT SPECIFICATIONS**

**List of Subject Specifications**

<b>Subject</b>	<b>Number</b>	<b>Title</b>	<b>NQF Level</b>	<b>Credits</b>
1	642601000_KS_01	Plumbing Trade Theory	4	100

## Specification for Knowledge Subject 1

Subject	Number	Title	NQF Level	Credits
1	642601000_KS_01	Plumbing Trade Theory	4	100

### 1.1 Related Knowledge Subject Code and Title

Xxxxxxx

### 1.2 Purpose of the Knowledge Subject

The main focus of the learning in this subject is to build an understanding of the theory required for the practise of plumbing. The knowledge acquired will enable learners to demonstrate an understanding of: Above Ground Drainage; Below Ground Drainage; Hot and Cold Water Reticulation; and Safe Working Practices.

The learning will enable learners to demonstrating an understanding of:

ST01	Principle of sanitation and plumbing legislation
ST02	Theory and Principles of drainage
ST03	Types, properties and functions of tools and equipment used in above and below ground drainage systems and sanitary installations
ST04	Principles and concepts pertaining to water traps and venting of an above ground sanitary drainage system
ST05	Components, materials and functions associated to found in above and below ground drainage systems
ST06	Components, materials and functions associated to of sanitary ware appliances
ST07	Theories, concepts and principles related to of planning and preparation of above ground sanitary drainage systems
ST08	Theories, concepts and principles of planning and preparation of a below ground drainage system
ST09	Theories, concepts and principles related to the installation of above ground sanitary drainage pipes and fittings installation
ST10	Theories, concepts and principles related to the installation of below ground drainage pipes and fittings installation
ST11	Principles and procedures of Sanitary Ware Appliance Installation
ST12	Theories, concepts and principles related to the informing maintenance and repairs to of above

	ground sanitary, and below ground, drainage systems
ST13	Theories, principles and concepts of Gradients and Levelling and the Basic principles of Excavation
ST14	Types, properties and functions of below ground non-waterborne sanitary disposal systems
ST15	Principles and properties of water
ST16	Basic plumbing principles pertaining to hot and cold water systems
ST17	Types, properties and functions of tools and equipment used for hot and cold water installations
ST18	Components, materials and functions associated to found in hot and cold water systems
ST19	Theories, concepts and principles of planning and preparation for an installation of hot and cold water reticulation installations
ST20	Principles and procedures for the installation of hot and cold pressure water pipes and pipe fittings
ST21	Theories, concepts and principles related to the of installation, maintenance and the repair s of fixed electric storage water heating systems
ST22	Basic principles of electricity pertaining to hot water cylinders
ST23	Concepts and principles related to of the maintenance of hot and cold water systems

### 1.3 Topic Guidelines

#### ST01: Principles of sanitation and plumbing legislation

##### *Topic Elements*

ST0101	Principle of sanitation
ST0102	Description and technique of waste water treatment
ST0103	Types, characteristics and properties of waste water
ST0104	Types and characteristics of diseases caused by poor sanitation
ST0105	Principles and functions of standards and codes of practice; and their relationship with bylaws

##### *Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Discussion the principle of sanitation and waste water treatment, and types of water.	40%
2	Identify and explain the stages of waste water treatment and its relationship to the avoidance of disease.	20%
3	Discuss the diseases caused by poor sanitation.	20%
4	Identify the different Codes of Practice and explain their purpose.	10%

5	Explain who sets a code of practice, who enforces it, and the importance of Bylaws.	5%
6	Explain how to obtain an SABS mark of approval.	5%

## **ST02: Theory and principles of drainage**

### *Topic Elements*

ST0201	Description and functions of above ground sanitary drainage systems
ST0202	Description and functions of below ground drainage systems
ST0203	Description and functions of stormwater drainage systems
ST0204	Concepts and principles of gradients, sizing, venting and access points
ST0205	Principles and functions of stacks, anchor blocks, pit latrines, french drains and septic tanks

### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	Define the term 'drain'.	15%
2	List and explain the 3 general drainage systems.	20%
3	Explain the functions of the soil, waste and vent drainage systems.	45%
4	List and explain the basic components of drainage systems.	15%
5	Explain what sewerage water is.	5%

## **ST03: Types, properties and functions of tools and equipment used in above and below ground drainage systems and sanitary installations**

### *Topic Elements*

ST0301	Describe the uses and functions of tools and equipment used in the installation of drainage systems and sanitary installations
ST0302	Discuss what are the typical plumbing consumables used in above and below ground drainage systems and sanitary installations

### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	List and explain the tools used for: measuring; cutting; excavating and compacting.	45%
2	Discuss the different types of drain cleaning equipment and mention which piece of equipment would be suitable for which type of job.	20%



3	Explain how drain rods would be used.	10%
4	Discuss the function of levelling equipment.	5%
5	Explain what drain cleaning equipment would be used in the absence of “inspection eyes”.	20%

**ST04: Principles and concepts pertaining to water traps and venting of an above ground sanitary drainage system**

*Topic Elements*

ST0401	Principles, characteristics and function of water traps, venting and air pressure
ST0402	Types and description of venting systems

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Discuss the importance of depth of seal.	15%
2	Analyse the causes of trap seal failure.	25%
3	Explain the function of venting	10%
4	List the types of ventilation pipes.	10%
5	Discuss the similarities and differences between the 3 venting system designs – two-pipe system, one-pipe system, and single-stack system.	40%

**ST05: Functions and components used in above and below ground drainage systems**

*Topic Elements*

ST0501	Define and discuss the characteristics of the following pipes and how they are joined: vitrified clay; cast Iron; uPVC; concrete.
ST0502	Discuss and explain sockets, junctions, bends.
ST0503	Explain the functions of: a stop end; a vent valve; a pan connector; SSN couplers.
ST0504	Define the following: gully trap; gully hopper; gully grating; gully surround.
ST0505	List the various types of uPVC fittings.
ST0506	List and discuss the different types of traps.
ST0507	Explain the functions of concrete pipes.

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Discuss the characteristics and types of waste water and water	25%
2	Explain the function of soil, waste and vent systems	35%
3	Identify the different codes of practice and explain their characteristics	40%

#### **ST06: Components, materials and functions of sanitaryware appliances**

##### *Topic Elements*

ST0601	Identify and discuss the types of materials used in the manufacture of sanitaryware appliances
ST0602	Provide a description, the properties, and functions of the different sanitaryware appliances
ST0603	Types of consumable plumbing materials

##### *Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Discuss the uses, advantages and disadvantages of the following materials in sanitary fixtures: vitreous china; cast and formed acrylic; stainless steel; enamelled cast iron.	45%
2	List the 3 common designs of toilet pans	10%
3	Analyse the difference between a close coupled and a semi-close coupled system.	5%
4	Define the term 'cistern'.	5%
5	Explain how the beta flushing valve works.	5%
6	List the types of wash hand basins.	5%
7	Discuss the installation of a bath.	10%
8	Define a shower tray; and give examples of sinks and wash troughs.	15%

#### **ST07: Theories, concepts and principles of planning and preparation of above ground sanitary drainage systems**

##### *Topic Elements*

ST0701	Characteristics and requirements of a single-stack system
ST0702	Theory and principles informing the calculation of fixture units - and sizing and gradient - and the characteristics of discharge pipes
ST0703	Principles and functions of branch connections and restriction zones
ST0704	Types, properties and functions of vent stack sizing and provisions of ventilation pipes
ST0705	Principles and functions of access points

*Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	Discuss the relevant SANS Codes of Practice for planning and preparing an above ground drainage system.	10%
2	Discuss the elements to take into account when designing the layout and sizing of the single stack above ground sanitary drainage system.	15%
3	Explain how to size the following: discharge pipes; the drain.	10%
4	Discuss how to size the vent stack and the reasons for a ventilation pipe, and why access points would be essential.	20%
5	Analyse the issues which arise with regards to branch connections and restriction zones.	15%
6	Analyse the issues involved in calculating the discharge load.	30%

**ST08: Theories, concepts and principles of planning and preparation of a below ground drainage system***Topic Elements*

ST0801	Theory and principles informing the calculation of volume and swell (bulking)
ST0802	Theory, principles and requirements of design layout and sizing of a below ground drainage system
ST0803	Theory and principles informing the calculation of fixture units - and sizing and gradient – and the characteristics of discharge pipes

*Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	List the units of measurement and explain the formula for the calculation of volume.	5%
2	Identify and discuss the relevant SANS Codes.	5%
3	Explain why plans and specifications are necessary, and why a site inspection is needed before installation of the drainage system.	40%
4	Discuss: the importance of the location of the municipal sewer; the location of vent pipes; hydraulic loading	10%
5	Explain the necessity of risk assessment, before commencement of work.	40%

**ST09: Theories, concepts and principles of above ground sanitary drainage pipes and fittings installation***Topic Elements*

ST0901	Methods of joining of different types of drainage pipes
ST0902	Characteristics and properties of bends and junctions
ST0903	Characteristics and functions of vent valves
ST0903	Principles and functions of bracketing and spacing
ST0903	Characteristics and procedures of testing and commissioning

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Explain the methods of joining above ground drainage pipes.	10%
2	Discuss the importance of flexible joints in bends and junctions.	10%
3	Explain the criteria for the installation of vent valves.	10%
4	Explain how expansion and contraction affects bracketing.	20%
5	Describe the tests which must be passed for a successful commissioning, and the issuing of a plumbing certificate of compliance.	50%

**ST10: Theories, concepts and principles of below ground drainage pipes and fittings installation**

*Topic Elements*

ST1001	Principles, properties and techniques of excavation, bedding, levelling and laying
ST1002	Principles, characteristics and requirements of concrete pipe work
ST1003	Principles and functions of access points
ST1004	Principles and functions of gullies
ST1005	Principles and functions of water and air testing
ST1006	Characteristics and techniques of backfilling and compaction

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	List the units of measurement and explain the formula for the calculation of volume.	5%
2	Identify and discuss the relevant SANS Codes of Practice.	15%
3	Discuss the process of excavation and the laying of pipes and fittings.	5%
4	Compare joining a twin wall pipe with a socket, and with a rubber ring.	5%
5	Discuss the cutting and joining of: earthenware pipes; and of cast iron pipes.	5%
6	Explain why all bends and junctions must have a flexible joint.	5%

7	Discuss the importance of: access points; access covers; gullies.	5%
8	Explain the purpose and procedure of inspection tests.	35%
9	Discuss and explain the correct method of backfilling and compaction.	20%

### **ST11: Principles and procedures of sanitary ware appliance installation**

#### *Topic Elements*

ST1101	Principles and procedures for the installation of a low level pan
ST1102	Principles and procedures for the installation of a bidet
ST1103	Principles and procedures for the installation of the bath
ST1104	Principles and procedures for the installation of a wall hung (bowl) urinal
ST1105	Principles and procedures for the installation of a wash basin

#### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	List and explain the steps to be taken in the installation of the following sanitaryware appliances: a low level pan; a bidet; a bath; a wall hung (bowl) urinal; a wash basin.	80%
2	Identify and discuss the various materials which are joined for the purposes of installing sanitaryware	20%

### **ST12: Theories, concepts and principles informing maintenance and repairs of above ground sanitary, and below ground, drainage systems**

#### *Topic Elements*

ST1201	Characteristics of scheduled and unscheduled preventative maintenance
ST1202	Procedures and techniques of drain cleaning
ST1203	Procedures and requirements for: sectional repairs of below ground uPVC drainage pipe; making a new branch connection; and repairs to an earthenware pipe

#### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	Define and give examples of: 1. Scheduled preventative maintenance and; 2. Unscheduled preventative maintenance	55%
2	Analyse and discuss the causes of blockages in drains, listing common blockage points;	30%

	and explain how the blockages would be cleared.	
3	Discuss sectional repairs of a below ground uPVC drainage pipe; how to make a new branch connection, using a uPVC pipe; and repairs to an earthenware pipe.	15%

### **ST13: Theories, principles and concepts of gradients and levelling and the basic principles of excavation**

#### *Topic Elements*

ST1301	Theory, principles and properties of Gradients, Fall and Levelling
ST1302	Description, properties and functions of Levelling Equipment
ST1303	Principles and properties of Safe Excavating and Trenching
ST1304	Description and properties of Soil and Stability, and the function of Soil Testing and Protective Systems
ST1305	Principles and procedures of Safe Working Practice when : entering and exiting excavations ; storing materials and mobile equipment ; hazardous gases are present and ; someone is buried alive
ST1306	Procedures when Working with Excavators and Backhoe Loaders

#### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	Define 'excavation' and 'trench', and discuss the importance of planning in the prevention of accidents.	20%
2	Discuss the types of soil and how soil is tested.	10%
3	Explain how cave-ins occur and discuss the protective systems which are used to prevent them.	10%
4	Discuss safety and: entering and exiting an excavation; materials and mobile equipment; hazardous gases; rescue procedures if someone is buried alive.	20%
5	Discuss safety precautions when working with excavators and backhoe loaders.	10%
6	Define 'gradient' and explain what is meant by 'fall'.	10%
7	Discuss levelling, and explain the difference between the inert level and the datum level.	10%
8	List the levelling equipment, explain how it is used, take a reading on the dumpy level and discuss the common errors when using levelling equipment	10%

**ST14: Types, properties and functions of below ground non-waterborne sanitary disposal systems***Topic Elements*

ST1401	Types and characteristics of alternative sanitary disposal systems
ST1402	Principles, properties and requirements of septic systems

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Define: septic systems; conservancy tanks; and pit and VIP latrines.	50%
2	Analyse and discuss the septic system.	50%

**ST15: Principles and properties of water***Topic Elements*

ST1501	Properties and attributes of water
ST1502	Principles and requirements of water treatment
ST1503	Characteristics of water pollution and its relationship to disease
ST1504	Types and properties of water

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Explain the water cycle.	5%
2	Discuss the different types of water treated at water treatment plants.	5%
3	Define water pollution, and discuss its causes.	10%
4	Explain water quality with reference to types of water, and acidity.	30%
5	Describe and discuss the physical states of water, referring to its density, expansion and contraction; and the consequences of the physics of the water molecule (i.e. Hydrogen bonds, surface tension and cohesion).	50%

**ST16: Basic plumbing principles pertaining to hot and cold water systems***Topic Elements*

ST1601	Theory, principles and properties of pressure
ST1602	Principles and characteristics of water flow

ST1603	Description and characteristics of corrosion
ST1604	Theory and principles of the thermal expansion characteristic of heated water

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Define pressure and the standard unit that pressure is measured in.	15%
2	List and explain the different types of pressure.	15%
3	Define water flow and discuss how: pipe friction; velocity; backflow; water pressure; and weight and volume of water; affect it.	15%
4	Describe and discuss the different types of corrosion.	5%
5	Explain thermal expansion and discuss its importance with reference to the closed plumbing system.	15%
6	Explain the importance of safety and the need for controls and protection in hot-water systems.	30%
7	Define stratification, and explain heat transfer.	5%

**ST17: Types, properties and functions of tools and equipment used for hot and cold water installations**

*Topic Elements*

ST1701	Types of tools and equipment, their description and specific use
ST1702	Principles of tool maintenance

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	To replace a 1m length of copper pipe in the bathroom wall: list which tools you would need, and explain how to use them.	20%
2	Discuss the basics of tool maintenance.	80%

**ST18: Components, materials and functions found in hot and cold water systems**

*Topic Elements*

ST1801	Description and functions of valves and isolating valves
ST1802	Description and function of taps
ST1803	Methods of heating; and types and properties of hot water heaters



ST1804	Types, properties and functions of materials utilized in hot and cold water pipe reticulation
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*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	List, describe, and explain the function of the different types of valves.	20%
2	Define a tap, and describe the different types.	5%
3	Describe and discuss the two types – storage system and demand/instantaneous – of hot water heater.	15%
4	Describe and discuss the components of the geyser, not forgetting the serial plate.	15%
5	Explain the two basic types of pipework material – and the two commonly used metal pipework materials.	5%
6	Describe the different methods of joining copper tubing.	10%
7	Explain GMS and how to join GMS pipe and fittings.	5%
8	List and describe the plastics commonly used in the Plumbing Industry; and where you would use HDPE piping.	15%
9	Explain the methods of joining HDPE piping.	5%
10	List and explain the two categories of polymer piping.	5%

**ST19: Theories, concepts and principles of planning and preparation for hot and cold water reticulation installations**

*Topic Elements*

ST1901	Theory, concepts and principles of the sizing of pipes
ST1902	Theory, concepts and principles informing the sizing of the hot water system
ST1903	Principles and procedures of site assessment
ST1904	Principle of risk assessment

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Explain how to measure and calculate volume.	5%
2	Identify the relevant SANS codes of practice for hot and cold water reticulation in a domestic building, and explain their importance.	15%
3	Discuss pipe sizing, referring to the various factors which must be taken into account in determining it: water velocity; flow rate; friction loss; mains pressure; pressure head.	30%

4	Discuss the factors to remember when sizing a hot water system (geyser) for a household, not forgetting the positioning of the geyser and 'dead legs'.	5%
5	Discuss the necessity of preparation and planning before commencing.	15%
6	Discuss the importance of a risk assessment.	30%

## **ST20: Principles and procedures for the installation of hot and cold pressure water pipes and pipe fittings**

### *Topic Elements*

ST2001	Regulations and Codes of Practice
ST2002	Procedures and methods of joining different types of pressure water pipes
ST2003	Procedures and requirements for the laying of pressure water pipes
ST2004	Testing procedure

### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	Discuss the three most common methods of joining pressure water pipes.	10%
2	Explain – step by step – how to solder copper pipes.	5%
3	Explain how GMS piping is joined together.	5%
4	Explain the mechanical compression fitting method for joining HDPE pipes and fittings.	20%
5	Discuss measures to protect pipes from temperature change.	20%
6	Discuss the laying of pressure water pipes: underground; above ground; under wall and under surface beds; in or through floors, concrete slabs or walls.	40%

## **ST21: Theories, concepts and principles of installation, maintenance and the repair of fixed electric storage water heating systems**

### *Topic Elements*

ST2101	Regulation and Code of Practice
ST2102	Description of open vented and closed system
ST2103	Characteristics of a balanced system
ST2104	Principle of electrical safety isolation
ST2105	Processes and procedures to handle and lift hot water heater cylinder onto/ into roof
ST2106	Principle and functions of the anti-syphon loop, and overflow and discharge pipes

ST2107	Processes and procedures to install thermal lagging and insulation
ST2108	Processes and procedures of commissioning and installation

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Explain the difference between an open vented and a closed vented system with regards to a geyser installation.	10%
2	Discuss why the pressure rating of the system must be universal throughout the entire system.	30%
3	Explain 'balanced pressure' when installing a geyser.	20%
4	Discuss the lifting, handling and removal or replacement of a geyser in a roof.	5%
5	Discuss the following components explaining their importance to the system as a whole: drip tray; anti-syphon loop; vacuum breaker; pressure-regulating valve; expansion control valve; temperature and pressure safety valve; lagging and insulation; element and thermostat.	30%
6	Explain the process of commissioning.	5%

**ST22: Basic principles of electricity pertaining to hot water cylinders**

*Topic Elements*

ST2201	Safety procedures when working with electricity
ST2202	Principles, properties and functions of the basic tools which measure electric current
ST2203	Characteristics, properties and functions of electrical components

*Internal Assessment Criteria and Weight*

	Internal Assessment Criteria	Weight
1	Discuss the measuring and calculation of electric current, and the basic tools required when working with electricity.	20%
2	List the electrical components, their function and how they work.	50%
3	Explain bonding and why it is important in a geyser installation.	30%

**ST23: Concepts and principles of the maintenance of hot and cold water systems**

*Topic Elements*

ST2301	Principles and requirements of scheduled and unscheduled preventative maintenance
ST2302	Principle and procedures for repairing of domestic pipe work

#### *Internal Assessment Criteria and Weight*

	<b>Internal Assessment Criteria</b>	<b>Weight</b>
1	Discuss the difference between scheduled and unscheduled maintenance.	35%
2	Discuss possible reasons for the malfunctioning of the following geyser components: element; thermostat; temperature and pressure safety valve.	20%
3	Discuss why a geyser may produce little or no hot water.	20%
4	Discuss how noise in the geyser and airlocks can be rectified.	15%
5	Explain how copper and galvanised pipes are replaced.	10%

### **1.3 Provider Accreditation Requirements for the Module**

#### *Physical Requirements:*

- Classroom furniture (chairs and tables)
- Handouts
- Plumbing text books
- Writing equipment (pencils/paper)

#### *Human Resource Requirements:*

- Facilitator/learner ratio 1 to 24

#### *Legal Requirements:*

- Accredited with AQP

### **1.4 Critical Topics to be Assessed Externally for the Subject**

1 None

### **1.5 Exemptions**

<b>Qualification or Learning Programmes that allows exemption from this Knowledge Subject:</b>			
<b>Number</b>	<b>Title</b>	<b>Institution</b>	<b>NQF Level</b>
NLRD No 58782	Further Education and Training Certificate: Plumbing		4

### SECTION 3B: PRACTICAL SKILLS MODULE SPECIFICATIONS

#### List of Practical Skills Module Specifications

	Number	Title	NQF Level	Credits
1	642601000_PS_01	Install, maintain and test above ground soil waste and vent systems and sanitaryware appliances	4	30
2	642601000_PS_02	Install, maintain and test below-ground drainage systems	4	35
3	642601000_PS_03	Install, maintain and test cold water and hot water systems	4	35
4	642601000_PS_04	Install, maintain and test rain water systems	4	30

## Specifications for Practical Skill Module 1

	Number	Title	NQF Level	Credits
1	642601000_PS_01	Install, maintain and test above ground soil waste and vent systems and sanitaryware appliances	4	30

### 1.1 Purpose of the Practical Skill Module

The focus of the learning in this module is on providing the learner an opportunity to install, maintain and test above ground soil waste and vent systems and sanitaryware appliances

The learner will be required to:

PS01	Plan and prepare above ground drainage system and sanitaryware appliances
PS02	Install above ground sanitary drainage pipes and fittings
PS03	Install sanitaryware appliances
PS04	Maintain and repair above ground sanitary drainage systems and sanitaryware appliances

### 1.2 Guidelines for Practical Skills

#### PS01: Plan and prepare above ground drainage system and sanitaryware appliances

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PA0101	Conduct a site assessment
PA0102	Conduct a risk assessment
PA0103	Determine human resources, equipment and consumable requirements
PA0104	Produce quote

##### *Applied Knowledge*

AK0101	Techniques of site assessment and risk assessment
AK0102	Methods of interpreting risk assessment results to determine human resources, equipment and consumable requirements
AK0103	Components and information required to produce a quote

AK0104	Calculation of Hydraulic Loading Discharge
AK0105	Relevant sections of the OHSA

#### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	<p>Site assessment is conducted and considerations include:</p> <ul style="list-style-type: none"> <li>• Suitability of site</li> <li>• Conducting a site assessment which meets the owner's or builder's requirements.</li> <li>• Having all necessary tools, components, water fittings and pipes to carry out installation at hand.</li> <li>• Correct sizing and pipe material determined.</li> <li>• Making sure that all the relevant standards and bylaws are adhered to.</li> <li>• Carrying out a risk assessment (see Risk Assessment).</li> <li>• Having the quotation accepted and making sure that the owner or builder understands the payment terms.</li> <li>• the owner's property is protected against possible damage while carrying out the work</li> </ul>
2	<p>Risk assessment reflects:</p> <ul style="list-style-type: none"> <li>• Hazards</li> <li>• Who might be harmed and how</li> <li>• What is currently done to reduce risk</li> <li>• Ways to put assessment into action</li> </ul>
3	Quotes are comprehensive and reflect thorough assessment completed
4	Explain Hydraulic Loading Discharge and how to calculate Fixture Units

#### **PS02: Install above ground sanitary drainage pipes and fittings**

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PS0201	Determine and select required access equipment
PS0202	Procure the relevant systems, materials, components tools and access equipment
PS0203	Erect and dismantle the procured access equipment

##### *Applied Knowledge*

AK0201	Procedures for procuring access equipment
AK0202	Procedures and processes of erecting and dismantling access equipment
AK0203	Industry codes of practice for solar installation
AK0204	Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	System selected is appropriate in terms of size, storage tanks and collector choice
2	All systems, materials and components are selected in accordance with SANS codes
3	Access equipment is erected in a safe and appropriate manner

### **PS03: Install sanitaryware appliances**

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PS0301 Procure relevant materials, fixtures and fittings

PS0302 Install: a Low Level Pan; a Bidet; a Bath; a Wall Hung (Bowl) Urinal; a Wash Basin

#### *Applied Knowledge*

AK0301 Methods and techniques of procuring materials and equipment

AK0302 Steps and procedures for the installation of Sanitaryware Appliances

AK0303 Industry codes of practice for installation of sanitaryware appliances

AK0304 Relevant sections of the Occupational Health and Safety Act

AK0305 Relevant SANS Codes

#### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	The products selected and procured are correct and appropriate to the specifications and requirements.
2	The steps followed for installation of : a Low Level Pan; a Bidet; a Bath; a Wall Hung (Bowl) Urinal; a Wash Basin are done in accordance with the relevant procedures
3	Installation is completed through adherence to relevant sections of the OHSA and SHEQ requirements



4	Installed sanitaryware appliance is fully functional and meet task specifications
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#### **PS04: Maintain and repair above ground sanitary drainage systems and sanitaryware appliances**

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PS0401	Clean partial and total Drain Blockages
PS0402	Repair damaged sections of above ground uPVC drainage pipes
PS0403	Make new Branch Connections

##### *Applied Knowledge*

AK0401	Methods and techniques of cleaning Drain Blockages
AK0402	Procedures and processes for repairing damaged sections of pipes
AK0403	Procedures and processes for making new branch connections
AK0404	Relevant sections of the Occupational Health and Safety Act
AK0405	Relevant SANS Codes

##### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	Cleaning drain blockages; repairing damaged sections of pipes; and the making of new branch connections are undertaken in accordance with the required steps and procedures
2	Maintenance and repairs are completed through adherence to relevant sections of the OSHA and other safety requirements
3	Maintenance and repairs are completed to reflect a fully functional above ground sanitary drainage systems and sanitaryware appliance that meet task specifications
4	Broken material and blockages are suitably disposed of in accordance with OHSA and SHEQ requirements

### **1.3 Provider Accreditation Requirements for the Module**

#### *Physical Requirements:*

- Hand tools per learner: hacksaw, gut line, chalk line, spirit level, carpenter's pencil, calking gun, club hammer, cold chisel, screw driver set, , wood saw

- PPE per learner: safety goggles, safety shoes, gloves.
- Drainage equipment per learner per module according to task requirements
- Access equipment according to task requirements
- Power tools: electric hammer drill, angle grinder, jig saw
- Facilities: area conducive for the installation of PVC piping fixed vertically, horizontally and suspended.
- Area conducive to the installation of all types of sanitary ware.

*Human Resource Requirements:*

- Facilitator/learner ratio 1 to 12
- Workshop assistant/learner ratio 1 to 4

*Legal Requirements:*

- Accredited with AQP
- Compliant with OHA requirements

**1.4 Critical Practical Activities to be Assessed Externally for the Module**

1 None

**1.5 Exemptions**

Qualification or Learning Programmes that allows exemption from this Knowledge Subject:			
Number	Title	Institution	NQF Level
NLRD No 58782	Further Education and Training Certificate: Plumbing		4

## Specifications for Practical Skill Module 2

	Number	Title	NQF Level	Credits
2	642601000_PS_02	Install, maintain and test below-ground drainage systems	4	35

### 1.1 Purpose of the Practical Skill Module

The focus of the learning in this module is on providing the learner an opportunity to install, maintain and test Below-Ground Drainage Systems

The learner will be required to:

PS01	Plan and prepare a Below-ground Drainage System
PS02	Excavate the Below-ground drainage site
PS03	Install Below-ground Drainage Pipes and Fittings
PS04	Maintain and Repair Below-ground Drainage Systems

### 1.2 Guidelines for Practical Skills

#### PS01: Plan and prepare a Below-ground Drainage System

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PA0101	Calculate volume and Hydraulic Loading Discharge
PA0102	Measure and calculate gradients and fall
PA0103	Procure the relevant materials, components and tools
PA0104	Use the spirit level; water level; boning rods; dumpy level; laser level

##### *Applied Knowledge*

AK0101	Methods of calculations
AK0102	Procedures and techniques of measuring Gradients and Levelling
AK0103	Specific SANS Codes
AK0104	Relevant sections of the Occupational Health and Safety Act
AK0105	Techniques and procedures for the operation of Levelling Equipment

### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Volume and Hydraulic Loading Discharge is calculated to determine the number of Discharge Sanitary fixtures, and in the sizing of pipes, and determining of gradients
2	Gradients and fall are measured and calculated
3	The spirit level; water level; boning rods; dumpy level and laser level are used demonstrating the appropriate method, technique and procedure

### **PS02: Excavate the Below-ground drainage site**

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PS0201	Test soil stability
PS0202	Excavate, construct bedding and level the trench floor

#### *Applied Knowledge*

AK0201	Procedures and techniques of testing soil stability
AK0202	Procedures and methods of excavating soil
AK0203	Procedures and methods of digging and excavating
AK0204	Industry codes of practice for solar installation
AK0205	Relevant sections of the Occupational Health and Safety Act
AK0206	Specific SANS Codes

### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Soil stability is tested by applying visual and manual tests in accordance with SHEQ requirements
2	Soil is excavated and the excavation is shored using sloping and benching methods in accordance with the relevant SANS Code of practice
3	Digging and excavations are undertaken and stabilised by adhering to protective systems guarding principles against cave-ins

### Practical Skill 3: Install Below-ground Drainage Pipes and Fittings

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PS0301	Lay pipes and fittings
PS0302	Size, cut and join uPVC, Cast Iron, and Earthenware, pipes and fittings
PS0303	Lift, place and join Concrete pipes
PS0304	Install Bends and Junctions and Access Points
PS0305	Apply Air and Water test to the below-ground drain

#### *Applied Knowledge*

AK0301	Methods and techniques of cutting and joining uPVC, Cast Iron, and Earthenware pipes
AK0302	Procedures and processes determining the installation of: Bends and Junctions; Access Points
AK0303	Industry codes of practice for Excavation and Levelling
AK0304	Relevant sections of the Occupational Health and Safety Act
AK0305	Relevant SANS Codes

#### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Pipes and fittings are sized, cut, joined and laid in accordance with health and safety specifications
2	Concrete pipes are lifted, placed and joined in accordance with health and safety specifications
3	Bends and Junctions and Access Points are Installed in accordance with the line of the drain
4	Air and Water test are applied to the below-ground drain to determine optimum level of functioning

### Practical Skill 4: Maintain and Repair Below-ground Drainage Systems

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PS0401	Diagnose and Clean partial and total Drain Blockages
PS0402	Repair Off-Set pipe, displaced or misaligned joints, and fractured, broken and deformed drains

PS0403	Repair damaged sections of below-ground uPVC drainage pipes
PS0404	Make new Branch Connections
PS0405	Repair Earthenware pipe

#### *Applied Knowledge*

AK0401	Methods and techniques of cleaning Drain Blockages
AK0402	Procedures and processes for repairing damaged sections of pipes, making new branch connections and repairing displaced or misaligned joints
AK0403	Industry codes of practice for Excavation and Levelling
AK0404	Relevant sections of the Occupational Health and Safety Act
AK0405	Relevant SANS Codes

#### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Partial and total Drain Blockages are diagnosed and cleaned in accordance with health and safety specifications
	Off-Set pipe, displaced or misaligned joints, and fractured, broken and deformed drains are repaired
2	Damaged sections of below-ground uPVC drainage pipes are repaired
3	Branch Connections are made
4	Earthenware pipes are repaired

### **1.3 Provider Accreditation Requirements for the Module**

#### *Physical Requirements:*

- Hand tools per learner: hacksaw, gut line, chalk line, spirit level, carpenter's pencil, calking gun, club hammer, cold chisel, screw driver set, , wood saw
- PPE per learner: safety goggles, safety shoes, gloves.
- Drainage equipment per learner per module according to task requirements
- Access equipment according to task requirements
- Power tools: electric hammer drill, angle grinder, jig saw
- Facilities: area conducive for the installation of PVC piping fixed vertically, horizontally and suspended.
- Area conducive to the installation of all types of sanitary ware.

*Human Resource Requirements:*

- Facilitator/learner ratio 1 to 12
- Workshop assistant/learner ratio 1 to 4

*Legal Requirements:*

- Accredited with AQP
- Compliant with OHA requirements

**1.4 Critical Practical Activities to be Assessed Externally for the Module**

1 None

**1.5 Exemptions**

Qualification or Learning Programmes that allows exemption from this Knowledge Subject:			
Number	Title	Institution	NQF Level
NLRD No 58782	Further Education and Training Certificate: Plumbing		4

### Specifications for Practical Skill Module 3

	Number	Title	NQF Level	Credits
3	642601000_PS_03	Install, maintain and test cold water and hot water systems	4	35

#### 1.1 Purpose of the Practical Skill Module

The focus of the learning in this module is on providing the learner an opportunity to install, maintain and test Cold Water and Hot Water Systems

The learner will be required to:

PS01	Plan and prepare to install, maintain and test cold water and hot water supply systems
PS02	Install cold water and hot water pipes and pipe fittings
PS03	Install hot water cylinders by applying basic electrical principles
PS04	Test cold and hot water supply systems
PS05	Maintain and repair cold water pipes and fittings
PS06	Maintain and repair hot water pipes and fittings

#### 1.2 Guidelines for Practical Skills

##### PS01: Plan and prepare to install, maintain and test cold water and hot water supply systems

###### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PA0101	Identify and select hot and cold water materials, pipes and relevant equipment
PA0102	Handle, transport and carefully store hot and cold water materials, pipes and relevant equipment
PA0103	Check the site for positioning of complete hot and cold water storage cylinders and pipes
PA0104	Procure and prepare access equipment as required

###### *Applied Knowledge*



AK0101	Procedures and methods for identifying hot and cold water materials, pipes and relevant equipment
AK0102	Procedures, techniques and methods of handling, transporting and storing hot and cold water components
AK0103	Procedures and techniques of interpreting drawings and checking the positioning of hot and cold water installations and components
AK0104	Processes and procedures for procuring and preparing access equipment
AK0105	Specific SANS Codes
AK0106	Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Hot and cold water materials, pipes and relevant equipment are identified and selected according to job requirements and instructions received
2	Hot and cold water materials, pipes and relevant equipment are handled, transported and carefully stored to prevent damage
3	The site is checked against working drawings where hot and cold water pipes and equipment are to be positioned.
4	Access equipment is acquired and prepared at the worksite in accordance with regulatory requirements for safe working practice.

### **PS02: Install cold water and hot water pipes and pipe fittings**

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0201	Procure the relevant materials, components and tools
PS0202	Join copper tubes and fittings; galvanised mild steel (GMS) pipes and fittings; HDPE pipes and fittings and Polymer pipes and fittings
PS0203	Utilize compression fittings and push fit fittings
PS0204	Lay Pressure water pipes: underground; above ground

#### *Applied Knowledge*

AK0201 Procedures and techniques of procuring materials, components and tools

- AK0202 Procedures, techniques and methods of joining copper tubes and fittings; galvanised mild steel (GMS) pipes and fittings; HDPE pipes and fittings and Polymer pipes and fittings
- AK0203 Methods and procedures of utilising compression fittings and push fit fittings
- AK0204 Procedures, techniques and methods of laying pressure water pipes underground and above ground
- AK0205 Specific SANS Codes
- AK0206 Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	Relevant materials, components and tools are procured using specific processes and procedures
2	Copper tubes and fittings are soldered in accordance with the relevant SANS Codes and meeting SHEQ requirements
3	HDPE pipes and fittings are joined using the mechanical compression fitting method in accordance with the relevant SANS Codes
4	Galvanised mild steel (GMS) pipes and fittings and Polymer pipes and fittings are joined in accordance with the relevant SANS Codes and meeting SHEQ requirements
5	Compression fittings and push fit fittings are utilised in accordance with SHEQ requirements
6	Pressure water pipes are laid under walls, surface beds, in or through floors, concrete slabs or walls in accordance with the relevant SANS Codes and meeting SHEQ requirements

### **PS03: Install hot water cylinders by applying basic electrical principles**

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0301	Operate basic Current Measuring Devices
PS0302	Calculate current flow (in Amps), electric potential (in Volts) and resistance (in Ohms)
PS0303	Install adequate thermal lagging and insulation

#### *Applied Knowledge*

- AK0301 Procedures and techniques of operating basic Current Measuring Devices
- AK0302 Procedures and processes for installing thermal lagging and insulation

AK0303 Specific SANS Codes

AK0304 Relevant sections of the Occupational Health and Safety Act

*Internal Assessment Criteria*

	Internal Assessment Criteria
1	Current Measuring Devices and tools required for working with electricity are operated in accordance with SHEQ requirements
2	Current flow is calculated in Amps, electric potential is calculated in Volts and resistance is calculated in Ohms
3	Adequate thermal lagging and insulation is installed using Isolating switches; Electrical Wiring; Circuit Breakers; Earthing; Ripple Relay Switches

**PS04: Test cold and hot water supply systems**

*Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0401 Perform Geyser Element and Thermostat tests

PS0402 Inspect for leakage

*Applied Knowledge*

AK0401 Procedures and techniques of Geyser Element and Thermostat testing

AK0402 Methods and procedures of inspecting leakages

AK0403 Specific SANS Codes

AK0404 Relevant sections of the Occupational Health and Safety Act

*Internal Assessment Criteria*

	Internal Assessment Criteria
1	Geyser Element and Thermostat are tested malfunctioning of the element; thermostat; temperature and pressure safety valve
2	Inspection are completed to determine if there are any leakages using the specific procedures and in accordance with SHEQ requirements

## **PS05: Maintain and repair cold water pipes and fittings**

### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0501 Diagnose and repair faults in pipes and taps

PS0502 Diagnose Water Hammer and Flow noise

### *Applied Knowledge*

AK0501 Procedures and techniques for diagnosing and repairing faults in pipes

AK0502 Procedures and techniques for diagnosing and repairing faults on taps

AK0503 Procedures and techniques for diagnosing Water Hammer and Flow noise

AK0504 Specific SANS Codes

AK0505 Relevant sections of the Occupational Health and Safety Act

### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	Faults in pipes are diagnose and repaired using pipe clamps and in accordance with SHEQ requirements
2	Faults on taps are diagnose and repaired using the steps and procedures for replacing float valves and tap washers and in accordance with SHEQ requirements
3	Diagnose Water Hammer and Flow noise

## **PS06: Maintain and repair hot water pipes and fittings**

### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0601 Diagnose Expansion noise in hot water systems and what it indicates

PS0602 Diagnose and repair leaks in Copper, Galvanised Mild Steel (GMS), PVC and composite pipes.

### *Applied Knowledge*

AK0601 Procedures and techniques for diagnosing Expansion noise in hot water systems

- AK0602 Procedures and techniques for diagnosing and repairing leaks in Copper, Galvanised Mild Steel (GMS), PVC and composite pipes
- AK0603 Methods and procedures of diagnosing faults
- AK0604 Specific SANS Codes
- AK0605 Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	Expansion noise in hot water systems are diagnose and repaired using the steps and procedures for adding clips and brackets and in accordance with SHEQ requirements
2	Leaks in Copper, Galvanised Mild Steel (GMS), PVC and composite pipes are diagnose and repaired using steps and procedures for ensuring the correct flow rate and in accordance with SHEQ requirements
3	hot water pipes and fittings are maintained and repaired to ensure that causes of airlocks have been addressed

### **1.3 Provider Accreditation Requirements for the Module**

#### *Physical Requirements:*

- Hand tools per learner: hacksaw, gut line, chalk line, spirit level, carpenter's pencil, calking gun, club hammer, cold chisel, screw driver set, , wood saw
- PPE per learner: safety goggles, safety shoes, gloves.
- Drainage equipment per learner per module according to task requirements
- Access equipment according to task requirements
- Power tools: electric hammer drill, angle grinder, jig saw
- Facilities: area conducive for the installation of PVC piping fixed vertically, horizontally and suspended.
- Area conducive to the installation of all types of sanitary ware.

#### *Human Resource Requirements:*

- Facilitator/learner ratio 1 to 12
- Workshop assistant/learner ratio 1 to 4

#### *Legal Requirements:*

- Accredited with AQP

- Compliant with OHA requirements

#### 1.4 Critical Practical Activities to be Assessed Externally for the Module

1 None

#### 1.5 Exemptions

Qualification or Learning Programmes that allows exemption from this Knowledge Subject:			
Number	Title	Institution	NQF Level
NLRD No 58782	Further Education and Training Certificate: Plumbing		4

## Specifications for Practical Skill Module 4

	Number	Title	NQF Level	Credits
4	642601000_PS_04	Install, maintain and test rain water systems	4	42

### 1.1 Purpose of the Practical Skill Module

The focus of the learning in this module is on providing the learner an opportunity to:

The focus of the learning in this module is this module is on providing the learner an opportunity to install, maintain and test rain water systems.

The learner will be required to:

PS01	Plan and prepare to install rainwater gutters and downpipes
PS02	Position gutter brackets and down pipe holder batts
PS03	Install rainwater gutters and downpipes
PS04	Rainwater gutters and downpipes are inspected for leaks and blockages

### 1.2 Guidelines for Practical Skills

#### PS01: Plan and prepare to install rainwater gutters and downpipes

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available, the learner must be able to:

PA0101	Identify and select specific rainwater gutters and pipes
PA0102	Handle, transport and carefully store rainwater gutters and pipes
PA0103	Check the site for positioning of down pipes
PA0104	Procure and prepare access equipment

##### *Applied Knowledge*

AK0101	Procedures and methods for identifying and selecting specific rainwater gutters and pipes
AK0102	Procedures, techniques and methods of handling, transporting and storing rainwater gutters

	and pipes
AK0103	Procedures and techniques of interpreting drawings and checking the positioning of down pipes
AK0104	Processes and procedures for procure and prepare access equipment
AK0105	Specific SANS Codes
AK0106	Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Rainwater gutters and down pipes are identified and selected according to job requirements and instructions received
2	Rainwater gutters and downpipes are handled, transported and carefully stored to prevent damage
3	The site is checked against working drawings where down pipes are to be positioned.
4	Access equipment is acquired and prepared at the worksite in accordance with regulatory requirements for safe working practice.

#### **PS02: Position gutter brackets and down pipe holder batts**

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0201	Position gutters and down pipes
PS0202	Position gutter brackets

##### *Applied Knowledge*

AK0201	Procedures and techniques of positioning gutters and down pipes
AK0202	Procedures and methods of positioning gutter brackets and down pipe holder batts
AK0203	Specific SANS Codes
AK0204	Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	Internal Assessment Criteria
1	Gutter brackets and down pipe holder batts are positioned to ensure gutters are straight when installed
2	Gutter brackets and down pipe holder batts are positioned to ensure the required positive



	gradient is achieved
3	Gutter brackets and down pipe holder batts are positioned to ensure gutters are adequately supported
4	Gutter brackets and down pipe holder batts are positioned to ensure rainwater run-off is collected from the roof

### **PS03: Install rainwater gutters and downpipes**

#### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0301	Procure and use rainwater fittings and jointing materials
PS0302	Install rainwater gutters and downpipes
PS0303	Check and clean rainwater gutters and downpipes

#### *Applied Knowledge*

AK0301	Procedures and techniques of procuring and using rainwater fittings and jointing materials
AK0302	Procedures and techniques of installing rainwater gutters and downpipes
AK0303	Methods and procedures of checking and cleaning rainwater gutters and downpipes
AK0304	Specific SANS Codes
AK0305	Relevant sections of the Occupational Health and Safety Act

#### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	Rainwater gutters and downpipes are installed in accordance with manufacturers specifications
2	Appropriate fittings and jointing materials are used to connect rainwater gutters and down pipes
3	Rainwater gutters and downpipes are checked to ensure rainwater is collected, transported and directed away from the building
4	Rainwater gutters and downpipes are inspected and confirmed to be leak free
5	Rainwater gutters and downpipes are checked, cleaned and confirmed to be free of obstruction
6	Off-cuts and packaging materials are removed from site in accordance SHEQ requirements

#### **PS04: Rainwater gutters and downpipes are inspected for leaks and blockages**

##### *Scope of Practical Skill*

Given the relevant SANS codes of practice, the plans and specifications for the dwelling or building, any checklists, templates, forms or procedure information available and materials, tools and equipment, the learner must be able to:

PS0401	Inspect rainwater gutters and downpipes
PS0402	Identify faults and causes of leaks and blockages
PS0403	Repair or replace rainwater gutters and downpipes
PS0404	Inspect rainwater gutters and downpipes functionality after repairs or replacements

##### *Applied Knowledge*

AK0401	Procedures and techniques of Inspect rainwater gutters and downpipes
AK0402	Procedures and techniques of Identify faults and causes of leaks and blockages
AK0403	Methods and procedures of Repair or replace rainwater gutters and downpipes
AK0404	Procedures and methods of Inspect rainwater gutters and downpipes functionality after repairs or replacements
AK0405	Specific SANS Codes
AK0406	Relevant sections of the Occupational Health and Safety Act

##### *Internal Assessment Criteria*

	<b>Internal Assessment Criteria</b>
1	Rainwater gutters and downpipes are inspected for leaks and blockages
2	Faults and their causes are identified
3	Repairs or replacements to rainwater gutters and downpipes and their fittings are carried out
4	Rainwater gutters and downpipes are inspected for functionality after repairs or replacements have been carried out

#### **1.3 Provider Accreditation Requirements for the Module**

##### *Physical Requirements:*

- Hand tools per learner: hacksaw, gut line, chalk line, spirit level, carpenter's pencil, calking gun, club hammer, cold chisel, screw driver set, , wood saw
- PPE per learner: safety goggles, safety shoes, gloves.

- Drainage equipment per learner per module according to task requirements
- Access equipment according to task requirements
- Power tools: electric hammer drill, angle grinder, jig saw
- Facilities: area conducive for the installation of PVC piping fixed vertically, horizontally and suspended.
- Area conducive to the installation of all types of sanitary ware.

*Human Resource Requirements:*

- Facilitator/learner ratio 1 to 12
- Workshop assistant/learner ratio 1 to 4

*Legal Requirements:*

- Accredited with AQP
- Compliant with OHA requirements

**1.4 Critical Practical Activities to be Assessed Externally for the Module**

1 None

**1.5 Exemptions**

Qualification or Learning Programmes that allows exemption from this Knowledge Subject:			
Number	Title	Institution	NQF Level
NLRD No 58782	Further Education and Training Certificate: Plumbing		4

### SECTION 3C: WORK EXPERIENCE MODULE SPECIFICATIONS

#### List of Work Experience Module Specifications

	Number	Title	NQF Level	Notional Hours
1	642601000_WE_01	Processes and procedures for installation and testing of above ground soil waste and vent systems and sanitaryware appliances	4	30
2	642601000_WE_02	Processes and procedures for installation and testing of below-ground drainage systems and performing basic building work	4	35
3	642601000_WE_03	Procedures and processes for installation and maintenance of cold water and hot water systems	4	35
4	642601000_WE_04	Procedures and processes for installation and maintenance of rain water systems	4	30

## Specification for Work Experience Module 1

	Number	Title	NQF Level	Notional Hours
1	642601000_WE_01	Processes and procedures for installation and testing of above ground soil waste and vent systems and sanitaryware appliances	4	30

### 1.1 Purpose of the Work Experience Module

The focus of the work experience is on providing the learner an opportunity to:

Gain exposure to and experience in, all activities related to the processes and procedures for the installation and testing of above ground soil waste and vent systems and sanitaryware appliances in a real life built environment. The Learner will be required to complete each Work Experience at least ten (10) times, in at least 4 different environmental scenarios e.g. open site, enclosed site, confined spaces, below ground, and high risk.

The learner will be required to:

WE01	Undertake site assessment, drain sizing and vent stack sizing, and risk assessment activities
WE02	Install above ground soil and waste pipes in a new building or during alterations
WE03	Install one of the following low level pan, bidet, bath, wall hung (Bowl) Urinal and wash basin in a new or alteration building
WE04	Test, commission and conduct house keeping processes

### 1.2 Guidelines for Work Experiences

#### **WE01: Undertake site assessment, drain sizing and vent stack sizing, and risk assessment activities**

##### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0101	Complete a minimum of 10 site assessment covering at least 5 different types of environmental scenarios within the duration of an hour each.
WA0102	Calculate a minimum of 10 hydraulic loading discharges in order to size the drain and the gradient in which it is to be installed covering at least 5 different types of environmental scenarios (e.g. open site, enclosed site, confined spaces, below ground, and high risk).
WA0103	Determine a minimum of 10 Vent Stack sizes in order to determine the vent stack diameter

	covering at least 5 different types of environmental scenarios (e.g. open site, enclosed site, confined spaces, below ground, and high risk)
WA0104	Complete a minimum of 10 risk assessments in accordance with SHEQ requirements after site assessment has been evaluated and completed.

#### *Supporting evidence*

SE0101	Written site assessments completed in each of the environmental scenarios.
SE0102	Written evidence on pipe sizes and hydraulic loading to be used as a specification
SE0103	List of pipe sizes, and the calculations and working out determining the vent stack size.
SE0104	The documented risk assessment and recommendations to comply with SHEQ requirements

### **WE02: Install above ground soil and waste pipes in a new building or during alterations**

#### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0201	Make a minimum of 10 contacts with client and make arrangements for installations
WA0202	Allow for expansion and contraction by anchoring the fitting and determine the correct spacing for pipes supports in a minimum of 10 different designs
WA0203	Apply the Air test as required by relevant SANS code in a minimum of 10 different designs
WA0204	Cut and join a minimum of 10 above ground drainage pipes and connect a vent valve in a minimum of 5 different environments
WA0205	Produce a minimum of 10 documents reflecting of co-ordination activities with other relevant parties or artisans on construction site

#### *Supporting Evidence*

SE0201	Any written documentation reflecting contact with client
SE0202	Detailed sketches of layout
SE0203	Written air test results, signed off by supervisor
SE0204	Supervisor sign-off on completed cutting and joining activities
SE0205	Copies of documents, reports, instructions, communiques with other relevant parties or artisans on construction site

**WE03: Install one of the following low level pan, bidet, bath, wall hung (Bowl) Urinal and wash basin in a new or altered building**

*Scope of Work Experience*

The person will be expected to engage in the following work activities at least twice for each of the reflected sanitary fittings (low level pan, bidet, bath, wall hung Urinal and wash basin):

WA0301	Mark out the position of sanitaryware appliances of the necessary holes to enable fitting and fixing of the appliance
WA0302	Use of the appropriate sized masonry drill and drill bit to drill holes in walls or floors for the marked out positions
WA0303	Use of hammer and chisel to cut holes through walls and a chisel to form “key” for mortar or the marked out positions
WA0304	Mix sand and cement in the correct ratio so as to obtain mortar of the correct consistency as required
WA0305	Use of Spirit Level to check level of positioned appliance and a drill for holes to fit fixing bolts to appliance as required
WA0306	Apply the correct sealing materials to the appropriate places
WA0307	Use of trowel to lay bricks for necessary supports, and plaster or add tile cladding and to smooth and cut away excess mortar as required for baths and showers
WA0308	Attach hanger brackets to the wall as required
WA0309	Connect and plumb all the sanitary fittings and traps

*Supporting Evidence*

SE0301	Supervisor sign-off on completed fittings and markings
SE0302	Supervisor sign-off on completed drill work
SE0303	Supervisor sign-off on correct key for mortar lock
SE0304	Supervisor sign-off on correct mixture of sand and cements
SE0305	Supervisor sign-off on level positioning of appliance
SE0306	Supervisor sign-off on correct sealing material application
SE0307	Supervisor sign-off on correct support building work
SE0308	Supervisor sign-off on correct hanger bracket installation
SE0309	Supervisor sign-off on correct connections

#### **WE04: Test, commission and conduct house keeping processes**

##### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0401	Conduct at least 10 tests for water-tightness by applying the Air Test on above ground drainage installations
WA0402	Conduct at least 10 commissioning activities of drainage systems in accordance with the relevant SANS Codes
WA0403	Conduct at least 10 house keeping routines in accordance with company policies and procedures

##### *Supporting Evidence*

SE0401	Copies of test reports signed by supervisor
SE0402	Copies of commissioning details signed by supervisor
SE0403	Housekeeping checklists

#### **1.3 Contextualised Workplace Knowledge**

- 1 Specific SANS Codes
- 2 Relevant Manufacturer's specifications and industry codes of practice
- 3 Warranty conditions
- 4 Relevant sections of the Occupational Health and Safety Act
- 5 South African Bureau of Standards (SABS).
- 6 National Building Regulations.
- 7 Company specific policies and procedures

#### **1.4 Criteria for Workplace Approval**

##### *Physical Requirements:*

- Exposure to all aspects of occupational tasks
- Tools and equipment to conduct occupational tasks
- The physical resources in terms of tools, equipment, systems, conditions and interfaces that the workplace must have to ensure that learners can participate in all work activities.

##### *Human Resource Requirements:*

- Learner to be supervised by a qualified/licenced plumber



*Legal Requirements:*

- Compliant to all relevant labour relations and employment legislation

**1.5 Assignments to be Assessed Externally**

Elements to be assessed	Evaluation Criteria

## Work Experience Module Specification 2

	Number	Title	NQF Level	Notional Hours
2	642601000_WE_02	Processes and procedures for installation and testing of below-ground drainage systems and performing basic building work	4	35

### 1.1 Purpose of the Work Experience Module

The focus of the work experience is on providing the learner an opportunity to:

Gain exposure to and experience in, all activities related to the processes and procedures for the installation and testing of below-ground drainage systems and performing basic building work in a real life built environment. The Learner will be required to complete each Work Experience at least ten (10) times, in at least 4 different environmental scenarios e.g. open site, enclosed site, confined spaces, below ground, and high risk.

The learner will be required to:

WE01	Undertake site assessment and risk assessment activities and communicate with peers and client in accordance with company protocols and procedures
WE02	Install below ground drainage pipes
WE03	Conduct scheduled preventative maintenance or unscheduled maintenance

### 1.2 Work Experiences Guidelines

**Work Experience 1: Undertake site assessment and risk assessment activities and communicate with peers and client in accordance with company protocols and procedures**

#### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0101	Complete site assessment according to the relevant criteria.
WA0102	Complete risk assessment in accordance with SANS criteria and Safe Work Practise
WA0103	Calculate the hydraulic loading discharge in order to size the drain
WA0104	Conform activities to relevant standards and by-laws

#### *Supporting evidence*

SE0101	Written site and risk assessments completed in each of the environmental scenarios.
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SE0102	Written evidence on drain sizes and hydraulic loading to be used as a specification
SE0103	The documented assessment and recommendations to comply with SHEQ requirements

## **Work Experience 2: Install below ground drainage pipes**

### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0201	Excavate, mark out, level, and lay the drainage pipe and fittings
WA0202	Cut and join uPVC piping, earthenware pipes and Cast Iron pipes
WA0203	Lift, place and join Concrete Pipes
WA0204	Determine the Line of the Drain
WA0205	Utilize flexible joints for Bends and Junctions
WA0206	Provide sufficient Access Points to the interior of any pipe installation
WA0207	Backfill and Compact

### *Supporting Evidence*

SE0201	Supervisor sign-off on excavation, marking out, levelling, and laying of the drainage pipes and fittings in accordance with OHSA and SHEQ requirements
SE0202	Supervisor sign-off on cutting and joining of uPVC, earthenware and cast iron pipes in accordance with OHSA and SHEQ requirements
SE0203	Supervisor sign-off on lifting, placing and joining of concrete pipes and the correct determination of the line of the drain in accordance with OHSA and SHEQ requirements
SE0204	Supervisor sign-off on utilisation of flexible joints for bends and junctions in accordance with OHSA and SHEQ requirements
SE0205	Supervisor sign-off on provision of sufficient access points to the interior of any pipe installation in accordance with OHSA and SHEQ requirements
SE0206	Supervisor sign-off on backfilling and compacting activities in accordance with OHSA and SHEQ requirements

## **Work Experience 3: Conduct scheduled preventative maintenance or unscheduled maintenance**

### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0301	Conduct scheduled preventative maintenance, testing and cleaning of drainage system
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WA0302	Conduct sectional repairs to a Below Ground uPVC Drainage pipe
WA0303	Conduct repairs to an Earthenware pipes

#### *Supporting Evidence*

SE0301	Documentary evidence of completed scheduled preventative maintenance, testing and cleaning of drainage system
SE0302	Documentary evidence of sectional repairs to a below ground uPVC drainage pipes
SE0303	Documentary evidence of repairs to an Earthenware pipes

### **1.3 Contextualised Workplace Knowledge**

- 1 Specific SANS Codes
- 2 Relevant Manufacturer's specifications and industry codes of practice
- 3 Warranty conditions
- 4 Relevant sections of the Occupational Health and Safety Act
- 5 South African Bureau of Standards (SABS).
- 6 National Building Regulations.
- 7 Company specific policies and procedures

### **1.4 Criteria for Workplace Approval**

#### *Physical Requirements:*

- Exposure to all aspects of occupational tasks
- Tools and equipment to conduct occupational tasks
- The physical resources in terms of tools, equipment, systems, conditions and interfaces that the workplace must have to ensure that learners can participate in all work activities.

#### *Human Resource Requirements:*

- Learner to be supervised by a qualified/licenced plumber

#### *Legal Requirements:*

- Compliant to all relevant labour relations and employment legislation

### **1.5 Assignments to be Assessed Externally**

Elements to be assessed	Evaluation Criteria


### Work Experience Module Specification 3

	Number	Title	NQF Level	Notional Hours
3	642601000_WE_03	Procedures and processes for installation and maintenance of cold water and hot water systems	4	35

#### 1.1 Purpose of the Work Experience Module

The focus of the work experience is on providing the learner an opportunity to:

Gain exposure to and experience in, all activities related to the processes and procedures for the installation and maintenance of cold water and hot water systems work in a real life built environment. The Learner will be required to complete each Work Experience at least ten (10) times, in at least 4 different environmental scenarios e.g. open site, enclosed site, confined spaces, below ground, and high risk.

The learner will be required to:

WE01	Undertake site assessment and risk assessment activities in accordance with company protocols and procedures
WE02	Install hot and cold pressure water pipes and pipe fittings
WE03	Install and conduct maintenance and repairs on fixed electric storage water heating systems
WE04	Conduct scheduled and unscheduled maintenance

#### 1.2 Work Experiences Guidelines

**Work Experience 1: Undertake site assessment and risk assessment activities in accordance with company protocols and procedures**

##### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0101	Complete site assessment according to the relevant criteria
WA0102	Complete risk assessment in accordance with SANS criteria and safe work practise
WA0103	Calculate the pipe sizes required, taking into account: water velocity; flow rate; friction loss; mains pressure; pressure head – elevation
WA0104	Calculate the size of the hot water system taking into account: vertical vs horizontal configurations; positioning and placing of geyser; dead legs

### *Supporting evidence*

SE0101	Written site and risk assessments completed in each of the environmental scenarios.
SE0102	Supervisor sign-off on the utilisation of correct pipe sizes required as per calculations of water velocity; flow rate; friction loss; mains pressure and pressure head in accordance with OHSA and SHEQ requirements
SE0103	Supervisor sign-off on the utilisation of correct size of the hot water system required as per calculations of vertical vs horizontal configurations; positioning and placing of geyser; dead legs in accordance with OHSA and SHEQ requirements
SE0104	The documented assessment and recommendations to comply with SHEQ requirements

### **Work Experience 2: Install hot and cold pressure water pipes and pipe fittings**

#### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0201	Join copper tubes and fittings using the correct solder and fluxes
WA0202	Utilize the required compression fittings
WA0203	Thread and join GMS piping
WA0204	Join HDPE pipes and fittings utilizing mechanical compression fittings
WA0205	Join Polymer pipes and fittings by: fusion weld; and compression fittings
WA0206	Provide for expansion or contraction; supports and bracket spacing
WA0207	Testing of pressure water pipes

### *Supporting evidence*

SE0201	Supervisor sign-off on the utilisation of correct solder and fluxes required for the joining of copper tubes and fittings in accordance with OHSA and SHEQ requirements
SE0202	Supervisor sign-off on the utilisation of the required compression fittings in accordance with OHSA and SHEQ requirements
SE0203	Supervisor sign-off on the threading of pipes and the correct joining of GMS piping, HDPE pipes and fittings utilizing mechanical compression fittings, Polymer pipes and fittings by: fusion weld; and compression fittings in accordance with OHSA and SHEQ requirements
SE0204	Supervisor sign-off on the provision made for expansion or contraction utilising supports and bracket spacing and testing of water pipes in accordance with OHSA and SHEQ requirements

### **Work Experience 3: Install and conduct maintenance and repairs on Fixed Electric Storage Water Heating Systems**

#### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0301	Remove and replace geyser; handle and lift geyser onto/ into roof
WA0302	Install anti-syphon loop in conjunction with a vacuum breaker
WA0303	Position discharge pipes so that they cannot be blocked and so that they lead to the exterior of the building
WA0304	Apply thermal lagging and insulation to the hot water cylinder and two metres of outlet piping plus one metre on the inlet side

#### *Supporting evidence*

SE0301	Supervisor sign-off on the correct procedures, and methods utilised to remove and replace geyser; handle and lift geyser onto/ into roof in accordance with OHSA and SHEQ requirements
SE0302	Supervisor sign-off on the correct procedures, and methods utilised to install anti-syphon loop in conjunction with a vacuum breaker in accordance with OHSA and SHEQ requirements
SE0303	Supervisor sign-off on the correct positioning of discharge pipes so that they cannot be blocked as well as lead the exterior of the building in accordance with OHSA and SHEQ requirements
SE0304	Supervisor sign-off on the correct procedures, and methods utilised for the application of thermal lagging and insulation to the hot water cylinder and provision of two metres of outlet piping plus one metre on the inlet side in accordance with OHSA and SHEQ requirements

### **Work Experience 4: Conduct scheduled and unscheduled maintenance**

#### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0401	Carry out scheduled preventative maintenance
WA0402	Carry out unscheduled maintenance when the system fails
WA0403	Test geyser element, thermostat and T&P valve
WA0404	Diagnose and repair cause of noise in system
WA0405	Diagnose and repair cause of airlocks



WA0406	Repair domestic pipe work – utilizing pipe clamps
WA0407	Repair a section of copper pipe and a section of GMS

#### *Supporting evidence*

SE0401	Supervisor sign-off on the correct procedures, and methods utilised for conducting scheduled preventative maintenance and unscheduled maintenance when the system fails. in accordance with OHSA and SHEQ requirements
SE0402	Documentary evidence of testing completing on geyser element, thermostat and T&P valve in accordance with OHSA and SHEQ requirements
SE0403	Documentary evidence of diagnosis and repairs cause of noise in system, airlocks, domestic pipe work, a section of copper pipe and a section of GMS in accordance with OHSA and SHEQ requirements

### **1.3 Contextualised Workplace Knowledge**

- 1 Specific SANS Codes
- 2 Relevant Manufacturer`s specifications and industry codes of practice
- 3 Warranty conditions
- 4 Relevant sections of the Occupational Health and Safety Act
- 5 South African Bureau of Standards (SABS).
- 6 National Building Regulations.
- 7 Company specific policies and procedures
- 8 Water Services Act

### **1.4 Criteria for Workplace Approval**

#### *Physical Requirements:*

- Exposure to all aspects of occupational tasks
- Tools and equipment to conduct occupational tasks
- The physical resources in terms of tools, equipment, systems, conditions and interfaces that the workplace must have to ensure that learners can participate in all work activities.

#### *Human Resource Requirements:*

- Learner to be supervised by a qualified/licenced plumber

#### *Legal Requirements:*

- Compliant to all relevant labour relations and employment legislation

### 1.5 Assignments to be Assessed Externally

Elements to be assessed	Evaluation Criteria

## Work Experience Module Specification 4

	Number	Title	NQF Level	Notional Hours
4	642601000_WE_04	Procedures and processes for installation and maintenance of rain water systems	4	30

### 1.1 Purpose of the Work Experience Module

The focus of the work experience is on providing the learner an opportunity to:

Gain exposure to and experience in, all activities related to the processes and procedures for the installation and maintenance of rain water systems in a real life built environment. The Learner will be required to complete each Work Experience at least ten (10) times, in at least 4 different environmental scenarios e.g. open site, enclosed site, confined spaces, below ground, and high risk.

The learner will be required to:

WE01	Plan and prepare to install rainwater gutters and downpipes and position gutter brackets
WE02	Install rainwater gutters and downpipes
WE03	Inspect rainwater gutters and downpipes for leaks and blockages
WE04	Conduct safe housekeeping and quality activities when following the procedures and processes for installation and maintenance of rain water systems

### 1.2 Work Experiences Guidelines

#### Work Experience 1: Plan and prepare to install rainwater gutters and downpipes and position gutter brackets

##### *Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0101	Interpret building drawings with job instructions to confirm the positioning of down pipes, type of pipes and rainwater gutters using company procedures and checklists
WA0102	Obtaining additional information from the client/professional team in instances where instructions or information on drawings is insufficient
WA0103	Handle, transport and store on site rainwater gutters and pipes in accordance with manufacturers specifications and company specific policies and procedures
WA0104	Procure and prepare access equipment in accordance with company specific policies and

	procedures
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*Supporting evidence*

SE0101	List of selected materials against building drawing
SE0102	Documentary proof of communication with client/professional team
SE0103	Signed confirmation from supervisor of adherence to manufacturers specifications and company specific policies and procedures for the handling, transporting and storage on site of rainwater gutters and pipes
SE0104	List of equipment procures for specific installation

**Work Experience 2: Install rainwater gutters and downpipes**

*Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0201	Install rainwater gutters and downpipes using appropriate fittings and jointing materials in accordance with manufacturers specifications and building drawings and specifications
WA0202	Check, clean and confirm that rainwater gutters and downpipes are free of obstructions and in working order
WA0203	Remove Off-cuts and packaging materials in accordance with company procedures
WA0204	Work in co-ordination with co-workers and other trades on site according to construction schedule

*Supporting evidence*

SE0201	Signed confirmation from supervisor of adherence to manufacturers specifications and building drawings and specifications during the installation of rainwater gutters and downpipes
SE0202	Certification from supervisor that rainwater gutters and downpipes are operational
SE0203	Certification by supervisor of site clearance in accordance with SHEQ requirements and company policies and procedures
SE0204	Schedule reflecting planned activities and actual activities

**Work Experience 3: Inspect rainwater gutters and downpipes for leaks and blockages**

*Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0301	Rainwater gutters and downpipes are inspected for leaks and blockages and faults and their causes are identified
WA0302	Recognising and reporting to the client problems relating to fault finding and repairs to rainwater gutters and downpipes

*Supporting evidence*

SE0301	Inspection report
SE0302	Written report to client

**Work Experience 4: Conduct safe housekeeping and quality activities when following the procedures and processes for installation and maintenance of rain water systems**

*Scope of Work Experience*

The person will be expected to engage in the following work activities:

WA0401	Clean, maintain and store tools, equipment and plumbing materials
WA0402	Maintaining minimum quantities of plumbing materials in accordance with task requirements
WA0403	Clean and maintain safety equipment and clothing in accordance with legislative requirement
WA0404	Clean work area and implement health, safety, environmental and quality procedures

*Supporting evidence*

SE0401	Completed housekeeping checklists
SE0402	Signoff by supervisor of adherence to safe housekeeping and quality activities when following the procedures and processes for installation and maintenance of rain water systems

**1.3 Contextualised Workplace Knowledge**

- 1 Specific SANS Codes
- 2 Relevant Manufacturer`s specifications and industry codes of practice
- 3 Warranty conditions
- 4 Relevant sections of the Occupational Health and Safety Act
- 5 South African Bureau of Standards (SABS).
- 6 National Building Regulations.
- 7 Company specific policies and procedures

#### 1.4 Criteria for Workplace Approval

##### *Physical Requirements:*

- Exposure to all aspects of occupational tasks
- Tools and equipment to conduct occupational tasks
- The physical resources in terms of tools, equipment, systems, conditions and interfaces that the workplace must have to ensure that learners can participate in all work activities.

##### *Human Resource Requirements:*

- Learner to be supervised by a qualified/licenced plumber

##### *Legal Requirements:*

- Compliant to all relevant labour relations and employment legislation

#### 1.5 Assignments to be Assessed Externally

Elements to be assessed	Evaluation Criteria

## SECTION 4: STATEMENT OF WORK EXPERIENCE

### STATEMENTS OF WORK EXPERIENCE

Curriculum Number:	
Curriculum Title:	

Learner Details	
Name:	
ID Number:	

Employer Details	
Company Name:	
Address:	
Supervisor Name:	
Work Telephone:	
E-Mail:	

	Number	Title	NQF Level	Notional Hours
1	642601000_WE_01	Processes and procedures for installation and testing of above ground soil waste and vent systems and sanitaryware appliances	4	30

WE01	Undertake site assessment, drain sizing and vent stack sizing, and risk assessment activities	Date	Signature
Work Activities			
WA0101	Complete a minimum of 10 site assessment covering at least 5 different types of environmental scenarios within the duration of an hour each.		
WA0102	Calculate a minimum of 10 hydraulic loading discharges in order to size the drain and the gradient in which it is to be installed covering at least 5 different types of environmental scenarios (e.g. open site, enclosed site, confined spaces, below ground, and high risk).		

WA0103	Determine a minimum of 10 Vent Stack sizes in order to determine the vent stack diameter covering at least 5 different types of environmental scenarios (e.g. open site, enclosed site, confined spaces, below ground, and high risk)		
WA0104	Complete a minimum of 10 risk assessments in accordance with SHEQ requirements after site assessment has been evaluated and completed.		
Supporting Evidence			
SE0101	Written site assessments completed in each of the environmental scenarios.		
SE0102	Written evidence on pipe sizes and hydraulic loading to be used as a specification		
SE0103	List of pipe sizes, and the calculations and working out determining the vent stack size.		
SE0104	The documented risk assessment and recommendations to comply with SHEQ requirements		

WE02	Install above ground soil and waste pipes in a new building or during alterations	Date	Signature
Work Activities			
WA0201	Make a minimum of 10 contacts with client and make arrangements for installations		
WA0202	Allow for expansion and contraction by anchoring the fitting and determine the correct spacing for pipes supports in a minimum of 10 different designs		
WA0203	Apply the Air test as required by relevant SANS code in a minimum of 10 different designs		
WA0204	Cut and join a minimum of 10 above ground drainage pipes and connect a vent valve in a minimum of 5 different environments		
WA0205	Produce a minimum of 10 documents reflecting of co-ordination activities with other relevant parties or artisans on construction site		
Supporting Evidence			
SE0201	Any written documentation reflecting contact with client		
SE0202	Detailed sketches of layout		



SE0203	Written air test results, signed off by supervisor		
SE0204	Supervisor sign-off on completed cutting and joining activities		
SE0205	Copies of documents, reports, instructions, communiques with other relevant parties or artisans on construction site		

WE03	Install one of the following low level pan, bidet, bath, wall hung (Bowl) Urinal and wash basin in a new or altered building	Date	Signature
Work Activities			
WA0301	Mark out the position of sanitaryware appliances of the necessary holes to enable fitting and fixing of the appliance		
WA0302	Use of the appropriate sized masonry drill and drill bit to drill holes in walls or floors for the marked out positions		
WA0303	Use of hammer and chisel to cut holes through walls and a chisel to form "key" for mortar or the marked out positions		
WA0304	Mix sand and cement in the correct ratio so as to obtain mortar of the correct consistency as required		
WA0305	Use of Spirit Level to check level of positioned appliance and a drill for holes to fit fixing bolts to appliance as required		
WA0306	Apply the correct sealing materials to the appropriate places		
WA0307	Use of trowel to lay bricks for necessary supports, and plaster or add tile cladding and to smooth and cut away excess mortar as required for baths and showers		
WA0308	Attach hanger brackets to the wall as required		
WA0309	Connect and plumb all the sanitary fittings and traps		
Supporting Evidence			
SE0301	Supervisor sign-off on completed fittings and markings		
SE0302	Supervisor sign-off on completed drill work		
SE0302	Supervisor sign-off on correct key for mortar lock		
SE0304	Supervisor sign-off on correct mixture of sand and cements		
SE0305	Supervisor sign-off on level positioning of appliance		
SE0306	Supervisor sign-off on correct sealing material application		
SE0307	Supervisor sign-off on correct support building work		
SE0308	Supervisor sign-off on correct hanger bracket installation		

SE0309	Supervisor sign-off on correct connections		
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WE04	Test, commission and conduct house keeping processes	Date	Signature
Work Activities			
WA0401	Conduct at least 10 tests for water-tightness by applying the Air Test on above ground drainage installations		
WA0402	Conduct at least 10 commissioning activities of drainage systems in accordance with the relevant SANS Codes		
WA0403	Conduct at least 10 house keeping routines in accordance with company policies and procedures		
Supporting Evidence			
SE0401	Copies of test reports signed by supervisor		
SE0402	Copies of commissioning details signed by supervisor		
SE0403	Housekeeping checklists		

	Contextulised Workplace Knowledge		
1	Specific SANS Codes		
2	Relevant Manufacturer`s specifications and industry codes of practice		
3	Warranty conditions		
4	Relevant sections of the Occupational Health and Safety Act		
5	South African Bureau of Standards (SABS).		
6	National Building Regulations.		
7	Company specific policies and procedures		
	Additional Assignments to be Assessed Externally		
1			
2			

	Number	Title	NQF Level	Notional Hours
2	642601000_WE_02	Processes and procedures for installation and testing of below-ground drainage systems and performing basic building work	4	35

WE01	Undertake site assessment and risk assessment activities and communicate with peers and client in accordance with company protocols and procedures	Date	Signature
Work Activities			
WA0101	Complete site assessment according to the relevant criteria.		
WA0102	Complete risk assessment in accordance with SANS criteria and Safe Work Practise		
WA0103	Calculate the hydraulic loading discharge in order to size the drain		
WA0104	Conform activities to relevant standards and by-laws		
Supporting Evidence			
SE0101	Written site and risk assessments completed in each of the environmental scenarios.		
SE0102	Written evidence on drain sizes and hydraulic loading to be used as a specification		
SE0103	The documented assessment and recommendations to comply with SHEQ requirements		

WE02	Install below ground drainage pipes	Date	Signature
Work Activities			
WA0201	Excavate, mark out, level, and lay the drainage pipe and fittings		
WA0202	Cut and join uPVC piping, earthenware pipes and Cast Iron pipes		
WA0203	Lift, place and join Concrete Pipes		
WA0204	Determine the Line of the Drain		
WA0205	Utilize flexible joints for Bends and Junctions		
WA0206	Provide sufficient Access Points to the interior of any pipe installation		
WA0207	Backfill and Compact		

Supporting Evidence			
SE0201	Supervisor sign-off on excavation, marking out, levelling, and laying of the drainage pipes and fittings in accordance with OHSA and SHEQ requirements		
SE0202	Supervisor sign-off on cutting and joining of uPVC, earthenware and cast iron pipes in accordance with OHSA and SHEQ requirements		
SE0203	Supervisor sign-off on lifting, placing and joining of concrete pipes and the correct determination of the line of the drain in accordance with OHSA and SHEQ requirements		
SE0204	Supervisor sign-off on utilisation of flexible joints for bends and junctions in accordance with OHSA and SHEQ requirements		
SE0205	Supervisor sign-off on provision of sufficient access points to the interior of any pipe installation in accordance with OHSA and SHEQ requirements		
SE0206	Supervisor sign-off on backfilling and compacting activities in accordance with OHSA and SHEQ requirements		

WE03	Conduct scheduled preventative maintenance or unscheduled maintenance	Date	Signature
Work Activities			
WA0301	Conduct scheduled preventative maintenance, testing and cleaning of drainage system		
WA0302	Conduct sectional repairs to a Below Ground uPVC Drainage pipe		
WA0303	Conduct repairs to an Earthenware pipes		
Supporting Evidence			
SE0301	Documentary evidence of completed scheduled preventative maintenance, testing and cleaning of drainage system		
SE0302	Documentary evidence of sectional repairs to a below ground uPVC drainage pipes		
SE0303	Documentary evidence of repairs to an Earthenware pipes		

	Contextualised Workplace Knowledge		
1	Specific SANS Codes		

2	Relevant Manufacturer`s specifications and industry codes of practice		
3	Warranty conditions		
4	Relevant sections of the Occupational Health and Safety Act		
5	South African Bureau of Standards (SABS).		
6	National Building Regulations.		
7	Company specific policies and procedures		
	Additional Assignments to be Assessed Externally		
1			
2			

	Number	Title	NQF Level	Notional Hours
3	642601000_WE_03	Procedures and processes for installation and maintenance of cold water and hot water systems	4	35

WE01	Undertake site assessment and risk assessment activities in accordance with company protocols and procedures	Date	Signature
Work Activities			
WA0101	Complete site assessment according to the relevant criteria		
WA0102	Complete risk assessment in accordance with SANS criteria and safe work practise		
WA0103	Calculate the pipe sizes required, taking into account: water velocity; flow rate; friction loss; mains pressure; pressure head – elevation		
WA0104	Calculate the size of the hot water system taking into account: vertical vs horizontal configurations; positioning and placing of geyser; dead legs		
Supporting Evidence			
SE0101	Written site and risk assessments completed in each of the environmental scenarios.		
SE0102	Supervisor sign-off on the utilisation of correct pipe sizes required as per calculations of water velocity; flow rate; friction loss; mains		

	pressure and pressure head in accordance with OHSA and SHEQ requirements		
SE0103	Supervisor sign-off on the utilisation of correct size of the hot water system required as per calculations of vertical vs horizontal configurations; positioning and placing of geyser; dead legs in accordance with OHSA and SHEQ requirements		
SE0104	The documented assessment and recommendations to comply with SHEQ requirements		

WE02	Install hot and cold pressure water pipes and pipe fittings	Date	Signature
Work Activities			
WA0201	Join copper tubes and fittings using the correct solder and fluxes		
WA0202	Utilize the required compression fittings		
WA0203	Thread and join GMS piping		
WA0204	Join HDPE pipes and fittings utilizing mechanical compression fittings		
WA0205	Join Polymer pipes and fittings by: fusion weld; and compression fittings		
WA0206	Provide for expansion or contraction; supports and bracket spacing		
WA0207	Testing of pressure water pipes		
Supporting Evidence			
SE0201	Supervisor sign-off on the utilisation of correct solder and fluxes required for the joining of copper tubes and fittings in accordance with OHSA and SHEQ requirements		
SE0202	Supervisor sign-off on the utilisation of the required compression fittings in accordance with OHSA and SHEQ requirements		
SE0203	Supervisor sign-off on the threading of pipes and the correct joining of GMS piping, HDPE pipes and fittings utilizing mechanical compression fittings, Polymer pipes and fittings by: fusion weld; and compression fittings in accordance with OHSA and SHEQ requirements		
SE0204	Supervisor sign-off on the provision made for expansion or contraction utilising supports and bracket spacing and testing of water pipes in accordance with OHSA and SHEQ requirements		

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WE03	Install and conduct maintenance and repairs on Fixed Electric Storage Water Heating Systems	Date	Signature
Work Activities			
WA0301	Remove and replace geyser; handle and lift geyser onto/ into roof		
WA0302	Install anti-syphon loop in conjunction with a vacuum breaker		
WA0303	Position discharge pipes so that they cannot be blocked and so that they lead to the exterior of the building		
WA0304	Apply thermal lagging and insulation to the hot water cylinder and two metres of outlet piping plus one metre on the inlet side		
Supporting Evidence			
SE0301	Supervisor sign-off on the correct procedures, and methods utilised to remove and replace geyser; handle and lift geyser onto/ into roof in accordance with OHSA and SHEQ requirements		
SE0302	Supervisor sign-off on the correct procedures, and methods utilised to install anti-syphon loop in conjunction with a vacuum breaker in accordance with OHSA and SHEQ requirements		
SE0302	Supervisor sign-off on the correct positioning of discharge pipes so that they cannot be blocked as well as lead the exterior of the building in accordance with OHSA and SHEQ requirements		
SE0304	Supervisor sign-off on the correct procedures, and methods utilised for the application of thermal lagging and insulation to the hot water cylinder and provision of two metres of outlet piping plus one metre on the inlet side in accordance with OHSA and SHEQ requirements		

WE04	Conduct scheduled and unscheduled maintenance	Date	Signature
Work Activities			
WA0401	Carry out scheduled preventative maintenance		
WA0402	Carry out unscheduled maintenance when the system fails		
WA0403	Test geyser element, thermostat and T&P valve		
WA0404	Diagnose and repair cause of noise in system		
WA0405	Diagnose and repair cause of airlocks		
WA0406	Repair domestic pipe work – utilizing pipe clamps		
WA0407	Repair a section of copper pipe and a section of GMS		

Supporting Evidence			
SE0401	Supervisor sign-off on the correct procedures, and methods utilised for conducting scheduled preventative maintenance and unscheduled maintenance when the system fails. in accordance with OHSA and SHEQ requirements		
SE0402	Documentary evidence of testing completing on geyser element, thermostat and T&P valve in accordance with OHSA and SHEQ requirements		
SE0403	Documentary evidence of diagnosis and repairs cause of noise in system, airlocks, domestic pipe work, a section of copper pipe and a section of GMS in accordance with OHSA and SHEQ requirements		

	Contextulised Workplace Knowledge		
1	Specific SANS Codes		
2	Relevant Manufacturer`s specifications and industry codes of practice		
3	Warranty conditions		
4	Relevant sections of the Occupational Health and Safety Act		
5	South African Bureau of Standards (SABS).		
6	National Building Regulations.		
7	Company specific policies and procedures		
8	Water Services Act		
	Additional Assignments to be Assessed Externally		
1			
2			



	Number	Title	NQF Level	Notional Hours
4	642601000_WE_04	Procedures and processes for installation and maintenance of rain water systems	4	30

WE01	Plan and prepare to install rainwater gutters and downpipes and position gutter brackets	Date	Signature
Work Activities			
WA0101	Interpret building drawings with job instructions to confirm the positioning of down pipes, type of pipes and rainwater gutters using company procedures and checklists		
WA0102	Obtaining additional information from the client/professional team in instances where instructions or information on drawings is insufficient		
WA0103	Handle, transport and store on site rainwater gutters and pipes in accordance with manufacturers specifications and company specific policies and procedures		
WA0104	Procure and prepare access equipment in accordance with company specific policies and procedures		
Supporting Evidence			
SE0101	List of selected materials against building drawing		
SE0102	Documentary proof of communication with client/professional team		
SE0103	Signed confirmation from supervisor of adherence to manufacturers specifications and company specific policies and procedures for the handling, transporting and storage on site of rainwater gutters and pipes		
SE0104	List of equipment procures for specific installation		

WE02	Install rainwater gutters and downpipes	Date	Signature
Work Activities			
WA0201	Install rainwater gutters and downpipes using appropriate fittings and jointing materials in accordance with manufacturers specifications and		

	building drawings and specifications		
WA0202	Check, clean and confirm that rainwater gutters and downpipes are free of obstructions and in working order		
WA0203	Remove Off-cuts and packaging materials in accordance with company procedures		
WA0204	Work in co-ordination with co-workers and other trades on site according to construction schedule		
Supporting Evidence			
SE0201	Signed confirmation from supervisor of adherence to manufacturers specifications and building drawings and specifications during the installation of rainwater gutters and downpipes		
SE0202	Certification from supervisor that rainwater gutters and downpipes are operational		
SE0203	Certification by supervisor of site clearance in accordance with SHEQ requirements and company policies and procedures		
SE0204	Schedule reflecting planned activities and actual activities		

WE03	Inspect rainwater gutters and downpipes for leaks and blockages	Date	Signature
Work Activities			
WA0301	Rainwater gutters and downpipes are inspected for leaks and blockages and faults and their causes are identified		
WA0302	Recognising and reporting to the client problems relating to fault finding and repairs to rainwater gutters and downpipes		
Supporting Evidence			
SE0301	Inspection report		
SE0302	Written report to client		

WE04	Conduct safe housekeeping and quality activities when following the procedures and processes for installation and maintenance of rain water systems	Date	Signature
Work Activities			
WA0401	Clean, maintain and store tools, equipment and plumbing materials		

WA0402	Maintaining minimum quantities of plumbing materials in accordance with task requirements		
WA0403	Clean and maintain safety equipment and clothing in accordance with legislative requirement		
WA0404	Clean work area and implement health, safety, environmental and quality procedures		
Supporting Evidence			
SE0401	Completed housekeeping checklists		
SE0402	Signoff by supervisor of adherence to safe housekeeping and quality activities when following the procedures and processes for installation and maintenance of rain water systems		

	Contextulised Workplace Knowledge		
1	Specific SANS Codes		
2	Relevant Manufacturer's specifications and industry codes of practice		
3	Warranty conditions		
4	Relevant sections of the Occupational Health and Safety Act		
5	South African Bureau of Standards (SABS).		
6	National Building Regulations.		
7	Company specific policies and procedures		
	Additional Assignments to be Assessed Externally		
1			
2			

## SECTION 5: External Assessment Specification

### Aspects of Internal Assessments to be re-assessed

Knowledge & theory	None
Practical Skills	None
Work Experience	None

### Qualification outcomes to be assessed externally

	The ability to...	Weight
Outcome 1	Install, maintain, test and repair above ground soil waste and vent systems and sanitaryware appliances	20
Outcome 2	Install, maintain, test and repair below-ground drainage systems and performing basic building work	30
Outcome 3	Install, maintain, test and repair cold water systems and hot water systems	30
Outcome 4	Install, maintain, test and repair rain water systems	20

### Assessment Criteria for each Integrated Assessment Outcome

Integrated assessment focus area 1	<p>The planning, preparation, installation, maintenance, testing and repairing activities for above ground soil waste and vent systems and sanitaryware appliances, can be justified and executed based on given instructions, drawings, materials, tools, equipment and consumables, whilst adhering to all occupational safety, health and environmental legislation during implementation of the following specific activities:</p> <ul style="list-style-type: none"> <li>• Plan and prepare above ground drainage system and sanitaryware appliances</li> <li>• Install above ground sanitary drainage pipes and fittings</li> <li>• Install sanitaryware appliances</li> <li>• Maintain and repair above ground sanitary drainage systems and sanitaryware appliances</li> </ul>
Integrated assessment focus area 2	<p>The planning, preparation, installation, maintenance, testing and repairing activities for below-ground drainage systems, can be justified and executed based on given instructions, drawings, materials, tools, equipment and</p>

	<p>consumables, whilst adhering to all occupational safety, health and environmental legislation during implementation of the following specific activities:</p> <ul style="list-style-type: none"> <li>• Plan and prepare a Below-ground Drainage System</li> <li>• Excavate the Below-ground drainage site</li> <li>• Install Below-ground Drainage Pipes and Fittings</li> <li>• Maintain and Repair Below-ground Drainage Systems</li> </ul>
Integrated assessment focus area 3	<p>The planning, preparation, installation, maintenance, testing and repairing activities for cold water and hot water systems, can be justified and executed based on given instructions, drawings, materials, tools, equipment and consumables, whilst adhering to all occupational safety, health and environmental legislation during implementation of the following specific activities:</p>
	<ul style="list-style-type: none"> <li>• Plan and prepare to install, maintain and test cold water and hot water supply systems</li> </ul>
	<ul style="list-style-type: none"> <li>• Install cold water and hot water pipes and pipe fittings</li> </ul>
	<ul style="list-style-type: none"> <li>• Install hot water cylinders by applying basic electrical principles</li> </ul>
	<ul style="list-style-type: none"> <li>• Test cold and hot water supply systems</li> </ul>
	<ul style="list-style-type: none"> <li>• Maintain and repair cold water pipes and fittings</li> </ul>
	<ul style="list-style-type: none"> <li>• Maintain and repair hot water pipes and fittings</li> </ul>
Integrated assessment focus area 2	<p>The planning, preparation, installation, maintenance, testing and repairing activities for rain water systems, can be justified and executed based on given instructions, drawings, materials, tools, equipment and consumables, whilst adhering to all occupational safety, health and environmental legislation during implementation of the following specific activities:</p>
	<ul style="list-style-type: none"> <li>• Plan and prepare to install rainwater gutters and downpipes</li> </ul>
	<ul style="list-style-type: none"> <li>• Position gutter brackets and down pipe holder batts</li> </ul>
	<ul style="list-style-type: none"> <li>• Install rainwater gutters and downpipes</li> </ul>
	<ul style="list-style-type: none"> <li>• Rainwater gutters and downpipes are inspected for leaks and blockages</li> </ul>

**Point(s) at which the external assessment will take place.**

1. No intermediate external assessments are required
2. On successful completion of the full learning programme and work experience
3. Final external assessment on each of the four (4) qualification outcomes

**Are there intermediate points in the learning process that should be assessed externally?**

No

**External Assessment Process**

The external assessment will be conducted through a combination of a written assessment and the evaluation of a portfolio of evidence of installations completed during the work experience component. The written examination will be concluded at an approved assessment site and marked by registered assessors. The PoE will be evaluated in accordance with NAMB policies and procedures.

**Eligibility requirements to qualify for external summative assessment**

1	Proof of formative assessment (including Phase Assessments) results or Statement of Results from training provider (or RPL results)
2	Statement of results for practical skills component
3	Work experience record
4	Fundamental learning competence

<b>Exemptions:</b>	
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**Criteria for registration of assessors**

1. Qualified plumber
2. Qualified and registered assessor
3. Minimum of five (5) years' experience as qualified plumber
4. Registered with PIRB as a plumber
5. Registered with NAMB as an assessor