Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

PIPE JOINING

WIRPJ301

Join pipe

Competence

RQF Level: 3

Learning Hours 50

Credits: 5

Sector: Agriculture and food processing

Trade: Water and irrigation

Module Type: General

Curriculum: CBSPLB3001- TVET Certificate 3 in water and irrigation

Issue Date: May, 2022

Purpose statement	This module describes the skills, knowledge and attitudes required by a trainee to perform pipe joining .it involves Identification and Selection of tools, equipment and materials to be used and clipping the pipe work according to the location in order to have a strong and tightened pipeline.					
Delivery modality	**Training delivery**		**100%**	**Assessment**		**Total 100%**
	Theoretical content		30%	Formative assessment	30%	100%
	Practical work:		70%		70%	
	• Group project and presentation	20%				
	• Individual project /Work	50%				

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Prepare the workplace	**1.1** PPE are properly used as per safety standards
	1.2 Working area /site is properly cleaned accordingly
	1.3 The works are properly sketched according to the pipe system
	1.4 Pipe lines are correctly marked according to the pipe work layout
	1.5 Holes and trenches are appropriately excavated /Drilled according to the pipe size
2. Identify and Select tools, equipment and materials to be used	**2.1.** Tools are properly selected according to the works
	2.2. Materials are properly selected according to the works
	2.3. Equipment are properly selected according to the works
3. Perform pipes Joining methods	**2.1.** Types of pipes are properly identified based on work
	2.2. Pipe fittings are properly identified according to the Materials
	2.3. Types of pipe Joint methods are properly chosen referring to the pipes materials
4. Clip the pipe	4.1 Clips are properly selected according to the sizes of pipes

work	4.2 Drill bit are properly selected according to the wall plug and screws
	4.3 Clips and Clipping technics are properly selected according to the works
5. Test piping system	5.1 Pressure are appropriately tested according to the works
	5.2 Leakage are properly tested according to the works
	5.3 Gravity are properly tested according to the works
6. Finish the work	6.1 Work place is properly cleaned
	6.2 Tools and equipment are properly cleaned and stored in their respective places
	6.3 Relevant report is properly prepared according to the works

Learning Outcome 1: Prepare the workplace	Learning hours: 10

Indicative content

- **The use of PPE**
  - ✓ Definition of PPE
  - ✓ Types of PPE
  - ✓ Importance of PPE
- **Cleaning of Working area /site**
  - ✓ Methods of site clearing
  - ✓ Tools used to clean workplace
- **Sketching the pipe system**
  - ✓ types of drawings
  - ✓ types of scales
  - ✓ use of Scale
  - ✓ Plumbing units measurements

Resources required for the learning outcome

Equipment	**Personal Protective equipment:** Helmet, goggles, Gloves ,overall, face mask, glasses ,hard boot, ear plugs ,rubber ,boot blooms , Air compressor
Materials	Pipes ,Copper pipes, PVC Pipes, UPVC Pipes, PPR Pipes, Galvanized pipes HDPE,PE ,PEX ABS,CPVC ,Elbow, Tee fitting ,Bushing, Union ,fitting Socket/Coupling
Tools	Spade, Moppers, Brushes ,Wires brushes ,Cloths rugs ,Shovel ,paper, Pencil, rubber, sharpener.
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided, Group discussion.
Formative assessment methods	Written assessment, Oral presentation, Performance assessment, Product based assessment, Project based assessment.

Course content	
Learning outcomes	**At the end of the module the learner will be able to:** **1.** Prepare the workplace **2.** Identify and Selecttools, equipment and materials to be used **3.** Perform pipes Joining methods **4.** Clip the pipe work **5.** Test pipe system **6.** Finish the work

Learning outcome 2: Identify and Select tools, equipment and materials to be used	**Learning hours: 10**
Indicative content	
• **Selection of Tools** ✓ Definition of Tools ✓ Classes and uses of plumbing Tools • **Selection ofMaterials** ✓ Definition of Materials ✓ Types of plumbing pipes, fittings and sealants • **Selectionof Equipment** ✓ Definition of equipment ✓ The use equipment ✓ Types of equipment	
Resources required for the learning outcome	
Equipment	Power threading machine,Shearing machine ,Power hacksaw, machine Hydraulicpress bending machine, Rolling machine, Foldingmachine, Angle grinder ,Sander machine ,Power drilling machine,PPR welding machine ,Welding machine, Oxy acetylene, welding machine,Diestock
Materials	Pipes ,Fittings, Sealant Materials, Clips, Wall plugs, Screws, Welding rod
Tools	PPR Scissors, Adjustable spanners, Pipe wrenches,Snips ,Hacksaw ,Pipe cutter, Screw driver, Tape measure ,Verniercaliper, Try square ,Combination square ,Pliers, Plumb bob ,Pipe vices ,Tongs, Clamps,Insulator.

Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise Individualized Trainer guided ,Group discussion
Formative assessment methods	Written assessment , Oral presentation , Performance assessment , Product based assessment ,Project based assessment

Learning outcome 3: Perform pipes Joining methods	**Learning hours: 10**
Indicative content	
• **Identification of types of pipes based on work** ✓ Identification of pipes, horses and tubes ✓ Types of pipes ✓ uses of pipes ✓ Properties of pipes ✓ Determination of pipe specification • **Identification pipe fittings** ✓ Definition of fittings ✓ Types of fittings • **Choosing the types of pipe Joining methods** ✓ Definition of pipe joint ✓ Types of pipe Joint ,threaded joint ,compression joint, fusion welding, pushed, flanged, capillary joint, brazing joint	
Resources required for the indicative content	
Equipment	Power threading machine , Shearing machine , Power hacksaw machine , Hydraulic press bender machine , Rolling machine , Folding machine , Angle grinder , Sander machine , Power drilling machine , PPR welding machine , Welding machine , Oxy acetylene welding machine ,Diestock
Materials	Pipes, Fittings , Sealant Materials ,Clips ,Wall plugs , Screws, Welding rod
Tools	Book, Internet , Pipes handout notes ,Hook ,Drill machine ,Chisel ,Hummer ,Tape measure ,Split level
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise ,Individualized ,Trainer guided ,Group discussion .
Formative assessment methods	Written assessment , Oral presentation ,Performance assessment ,Product based assessment ,Project based assessment .

Learning outcome 4: Clip the pipe work	Learning hours :5
Indicative content	
• **Selection of the sizes of clips and clipping Technics** ✓ Definition of pipe clip ✓ Types of pipe clips ✓ Clipping Method • **Selection of drill bit according to the wall plug and screws** ✓ Definition of wall plug, drill bit, screw ✓ Tool used in drilling Drill machine Chisel Hummer ✓ Types of drill bits ✓ Types of plug and screws • **Fix the clips** ✓ Clips Positioning ✓ Size of clip	
Resources required for the learning outcome	
Equipment	Drill machine, helmets, overall, safety boots, goggles, glasses
Materials	Plugs, clips, wall plugs,
Tools	Drill machine, Chisel, Hummer, screw drives,
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided, Group discussion.
Formative assessment methods	Written assessment, Oral presentation, Performance assessment, Product based assessment, Project based assessment.

Learning outcome 5. Test piping system	Learning hours: 10
Indicative content	
• **Leak test methods** ✓ Pressure test ✓ Check the slope • **Leak test** ✓ **Types of test**	

- Smoke
- Water pressure
- Air compressor

- **Gravity test**
  - ✓ Definition of gravity
  - ✓ Test by flushing system

Resources required for the indicative content	
Equipment	Air compressor, helmets, overall, safety boots, goggles, glasses
Materials	Pipes, fittings,
Tools	Pipes wrenches, spanner, hack saws. …….
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided, Group discussion.
Formative assessment methods	Written assessment, Oral presentation, Performance assessment, Product based assessment, Project based assessment.

Learning outcome 6: Finish the work	**Learning hours: 5**

Indicative content

- **Cleaning work place**
  - ✓ **Methods of clean**
    - Air pressure
    - Soap
    - Cleaning with cloth rugs
    - Moppers
    - Sponges
    - Oil
    - Grease

- **Cleaning and storing tools and equipment**
  - ✓ Rearrange and Remove the remains metal chips and dust from the working place
- **Preparation relevant report**
  - ✓ usable and remain materials
  - ✓ condition tools

Equipment	Air compressors, helmets, overall, safety boots, goggles, glasses, duster mask
Materials	Cloth rugs, Soap, water, oil/grease
Tools	Spanners, adjustable spanners, pipe wrenches,
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided, Group discussion.
Formative assessment methods	Written assessment, Oral presentation, Performance assessment, Product based assessment, Project based assessment.

References:

1. Bing Wen SHAN BIAN ZHU, *Cement Concrete Pavement Construction*,1990, Abebooks
2. De Vekey RC (2001). *Bricks blocks and masonry made from aggregate concrete: Part 2 – APPEarance and environmental aspects*, BRE Digest 460, Part 2.
3. M.Rashad Islam &Rafiqul A Tarelder, Pavement Design: Materials, Analysis,2016, McGraw-Hill Education
4. Norbert J. Delatte, *Concrete Pavement Design, Construction, and Performance Second Edition*,2016 Routledge
5. William & Radford, *Cement Houses and How to Build Them ,1996*, McGraw-Hill Education