



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

PRELIMINARY PUMPING ACTIVITIES

WIRPP301

Conduct preliminary pumping activities

Competence

RQF Level: 3

Learning Hours



40

Credits: 4

Sector: Agriculture and food processing

Trade: Water and Irrigation

Module Type: General

Curriculum: AFPWIR 3001- TVET Certificate III in water and irrigation

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Purpose statement	<p>This module describes the skills, knowledge and attitude required to conduct preliminary pumping activities.</p> <p>At the end of this module, learners will be able to collect basic information related to the Pumping schedule; Carry out preliminary pumping operations; carry out the proper safety and assembly of pumping system components;</p> <p>Qualified learners deemed competent to this competency may work alone or with others on routine tasks in marshland, hillside, small scale irrigation, garden, greenhouses, agricultural land, rain water harvesting, In situ rain water harvesting and ground water harvesting related activities under minimum supervision.</p>					
Delivery modality	Training delivery		100%	Assessment		Total 100%
	Theoretical content		30%	Formative assessment		30%
	Practical work:		70%			70%
	<ul style="list-style-type: none"> Group project and presentation 	20%				
<ul style="list-style-type: none"> Individual project /Work 	50%			100%		

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Collect basic information related to the Pumping schedule	1.1. Documents are adequately accessed and interpreted to the pumping activities
	1.2. Pumping schedule is regularly consulted and read in terms of chronologic sequence of activities
	1.3 Personal protective equipment for pumping activities are appropriately selected
2. Carry out preliminary pumping operations	2.1. Voltage and amperage of pump are appropriately checked for irrigation purposes
	2.2. Pump engine and vessels are adequately and regularly greased, oiled and lubricated in accordance with manufacturer's specifications
	2.3. Used oil, lubricant and other waste are properly disposed

	of in accordance with legislative and site requirements
	2.4. Leakage from pipes is regularly checked to ensure their efficient uses
	2.5 Power authority is timely consulted for ensuring the availability of electricity
3. Carry out the proper safety and assembly of pumping system components	3.1. Pumping checklist is appropriately established according to the running of pumping program
	3.2. Water distribution pipes and fittings are properly checked to ensure for the safety and proper water flow
	3.3. Pipes and their fittings are appropriately assembled before running the system
	3.4 Pumping system fittings are properly adjusted to ensure better flow network.

Course content

Learning outcomes	At the end of the module the learner will be able to:
	<ol style="list-style-type: none"> 1. Collect basic information related to the Pumping schedule; 2. Carry out preliminary pumping operations; 3. Carry out the proper safety and assembly of pumping system components

Learning outcome 1: Collect basic information related to the Pumping schedule	Learning hours: 15
Indicative content	
<ul style="list-style-type: none"> • Assessment and interpretation of documents; <ul style="list-style-type: none"> ✓ Source of water (quality and quantity) ✓ Types of lubricant ✓ Types of greases ✓ Types of fuel ✓ Power sources ✓ Types of pumps and their technical specifications 	

<ul style="list-style-type: none"> ✓ Principles of automatic and manual pumping systems ✓ Types of valves; <ul style="list-style-type: none"> ✚ Suction and delivery valves ✚ Altitude valve (Float valve) ✓ Types of strainers ✓ Elements of pump control panel ✓ Pressure measurement devices ✓ Discharge measurement devices • Consultation and reading pumping schedule; <ul style="list-style-type: none"> ✓ Read the pumping schedule ✓ Interpret the pumping schedule • Select appropriate personal protective equipment for pumping activities <ul style="list-style-type: none"> ✓ Types of hazards <ul style="list-style-type: none"> ✚ Falling debris, excessive noise, electrical wiring, chemical explosion ✓ Selection of Personal protective equipment for pumping activities 	
Resources required for the learning outcome	
Equipment	Pump engine/generator/ power source, Pump, moto pump, Sensor, Control panel, control station,
Materials	Flip chart, Books, land, Lubricants, Fuels, Water, Greases, Pipes, Technical manual, Pipe fittings, Valves, Pump filters(Foot valve and screens), pressure gauge, air release valve, coveralls, gloves, boots, earplugs, helmets.
Tools	Irrigation tool box, Shovel, Mattock, Tamper, PVC Pipe Cutter, Hack Saw, Wire Cutter/stripper, Screw Drivers, Spade, Tamper Bar, and Digging Bar, R measuring tape, hammer
Facilitation techniques	<ul style="list-style-type: none"> • Presentation • Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Oral presentation • Performance assessment • Project based assessment

Indicative content

- Checking the voltage and amperage of the pump
 - ✓ Pump engine specifications on voltage and amperage range
 - ✓ Types of cooling systems to protect the pump engine from high temperatures
- Greasing, oiling and lubrication of the pump engine and air vessels
 - ✓ Oiling the pump engine and air vessels
 - ✓ Greasing the pump engine
 - ✓ Lubricating the pump, the pump engine and air vessels
- Dispose the used oil, lubricant and other waste
 - ✓ Site selection criteria;
 - ✓ Managing hazardous waste
 - ✓ Waste Disposal method
- Checking the leakages from pipes
 - ✓ Irrigation system layout
 - ✓ Pipes and fittings specifications
 - ✓ Types of couplings
 - ✚ Latch
 - ✚ Perrot
 - ✚ Bauer
 - ✓ Causes of pipeline leakages
 - ✚ Broken seals connector, clogged lines, corrosion, damaged pipe joints, excess water pressure, intruding tree roots, loose water connectors
- Consult the power authority for ensuring the availability of electricity

Resources required for the indicative content

Equipment	Pump, air vessel, pump engine, control panel
Materials	Flip chart, Books, Technical manual, Pipes and fittings, Oil, Lubricants, Greases, Legislative measures document, Waste disposal sites, Water, washers and O-ring
Tools	Software (if automatic running of the pump), Voltage and current meters, PIPE Wrench, valve seat wrench,
Facilitation techniques	<ul style="list-style-type: none"> • Demonstration and simulation • Group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment	<ul style="list-style-type: none"> • Written assessment

methods	<ul style="list-style-type: none"> • Oral presentation • Performance assessment • Project based assessment
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Learning outcome 3: Carry out the proper safety and assembly of pumping system components		Learning hours: 10
Indicative content		
<ul style="list-style-type: none"> • Establish the pumping checklist according to the running of pumping program <ul style="list-style-type: none"> ✓ Defect of Embroidery machine ✓ Breaking needles ✓ Skipping stitch ✓ Upper threads breaking • Check the connection of water distribution pipes and fittings <ul style="list-style-type: none"> ✓ Main, sub-mains pipes and hydrants; ✓ Laterals and fittings specifications • Ensure for the proper assembly of pipes and their fittings before running the system <ul style="list-style-type: none"> ✓ Pipes and fittings assembly ✓ Laterals and emitters(sprinklers/drippers) 		
Resources required for the indicative content		
Equipment	Pump, air vessel, pump engine, control panel, drip irrigation kit/ sprinkler irrigation kit.	
Materials	Flip chart, Books, Technical manual, Pipes, fittings, Legislative measures document, Water, emitters	
Tools	Software (if automatic running of the pump), Voltage, pipe wrench, tool box	
Facilitation techniques	<ul style="list-style-type: none"> • Demonstration and simulation • Group work • Practical exercise • Individualized • Trainer guided • Group discussion 	
Formative	<ul style="list-style-type: none"> • Written assessment 	

assessment methods	<ul style="list-style-type: none">• Oral presentation• Performance assessment• Project based assessment
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References

1. NEH, Amend. 78, January 2016” Irrigation Pumping Plants” Part 623 Irrigation National Engineering Handbook United States Department of Agriculture Natural Resources Conservation Service
2. FAO, 2001 *“Irrigation Pumping Plant”* Irrigation Manual Module 5 Developed by Andreas P. SAVVA and Karen FRENKEN Water Resources Development and Management Officers FAO Sub-Regional Office for East and Southern Africa In collaboration with Simon MADYIWA, Irrigation Engineer Consultant Kennedy MUDIMA, National Irrigation Programme Officer, Zimbabwe Tove LILJA, Associate Professional Officer, FAO-SAFR Victor MTHAMO, Irrigation Engineer Consultant, Harare, Zimbabwe 2001