Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

IMPROVED COOKING STOVE

RENIS301

Make improved cooking stove

Competence

RQF Level: 3

Learning Hours 50

Credits: 5

Sector: Energy

Trade: Renewable energy

Module Type: Specific

Curriculum: ENGREN3001- TVET Level 3 in Renewable Energy

Issue Date: April 2022

<table>
<tr><td>Purpose statement</td><td colspan="6">This module describes the skills, knowledge and attitude required to fabricate the improved cooking stove using metal or bricks. At the end of this module, learners will be able to prepare materials for improved cooking stove, make metal or bricks stove,</td></tr>
<tr><td>Learning to be assumed</td><td colspan="6">Physics, chemistry</td></tr>
<tr><td rowspan="7">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group project and presentation</td><td>20%</td></tr>
<tr><td>• Individual project /Work</td><td>50%</td></tr>
<tr><td colspan="3"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
</table>

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. **Prepare materials for improved cooking stove**	1.1. The drawing details are interpreted referring to the stove design
	1.2. Materials and tools are properly selected according to the improved stove requirements
	1.3. Materials are specifically grouped by category according to their use
2. Make metal stove	2.1. The dimensions are precisely taken and correctly marked on the metal sheet as per drawing details
	2.2. Metal sheet is correctly cut in accordance with dimensions taken
	2.3. The outer cylinder is fabricated correctly according to design
	2.4. The insulation and liner are embedded in the outer cylinder as per design
	2.5. The stove is properly painted in respect to the stove design
	2.6. The stove performance is tested according to required efficiency
3. Make brick stove	3.1. Materials and tools for brick stove construction are properly prepared according to the work to be done
	3.2. The working area for brick stove construction is correctly according to the work to be done
	3.3. Elevation ,combustion chamber and chimney are built as per brick stove design
	3.4. Finishing works are properly performed to the stove in accordance with the brick stove design
	3.5. The brick stove performance is tested according to required efficiency

Course content	
Learning outcomes	**At the end of the module the learner will be able to:** 1. Prepare material for improved stove **2.** Fabricate the metal stove 2. Construct the brick stove
Learning outcome 1: Prepare materials for improved stove 1.	**Learning hours: 10**
Indicative content	
• Interpretion of drawing details ✓ **symbols** ✓ **views** ✓ **scale** ✓ Grouping of materials **Grouping as per t**ypes of materials, ✓ Grouping as per use of mat**erials** • selection of materials and tools required for improved metal stove ✓ **Types of Materials** ✓ **Tools**	
Resources required for the learning outcome	
Equipment	▪ **Projector , hearing machine, riveting machine , welding machine**
Materials	▪ **Metal sheet, Bolt, Nuts, Nails , Cutting wheel, clay, cement , bricks, paint, tiles.**
Tools	▪ **Measurement tape, Notebook / Pen, Personal Protective Equipment** ▪ **Cross hammer , scissor .**
Facilitation techniques and learning activities	• Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion •
Formative assessment methods	• Written assessment • Oral presentation • Performance based assessment • Product based assessment • Project based assessment •

Learning outcome 2: Fabricate metal stove	**Learning hours: 20**

- Measuring -, marking and cutting metal sheet
  - Measurement instrument
  - Marking tools

Way of measuring, marking and Cutting metal sheet

- Outer cylinder fabrication
  - metal sheet edge preparation
  - Bend
  - Join
  - Fixing pot rests, handle, door, and stove stand

- Fixing insulation and liner in the outer cylinder
  - Putting the insulator
  - Compacting and smoothing the insulator
  - Embedding the liner
- Painting and testing the metal stove
  - paint selection
  - painting
  - testing the stove

Resources required for the indicative content	
Equipment	Bending machine, Drilling machine, welding machine , riveting machine , air compressor, painting machine
Materials	Drill bits, Cutting wheel, Metal rod, Metal sheet, Heat insulators, Paints
Tools	Cross Hammer, Ball pin hammer, Plastic hammer. Scriber , Steel Ruler , Try square , Protractor , Scissors, Center punch, PPE. Hand saw, Bags , Brush , Pang
Facilitation techniques and learning activities	• Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion •
Formative assessment methods	• Written assessment • Oral presentation • Performance based assessment • Product based assessment • Project based assessment

Learning outcome 3: Make brick stove	Learning hours: 20
Indicative content	
• **Preparation of materials and tools for brick stove construction** ✓ Types of tools ✓ Types of materials ✓ Mixing ratio • **Set out the working area for brick stove construction** ✓ Select tools ✓ Fix pegs ✓ Foundation • **Build the elevation, combustion chamber and chimney** ✓ materials ✓ Walls construction ✓ Frames of combustion chamber, door, pot rests and chimney ✓ shape the combustion chamber and finishing ✓ Plaster, finishing and testing	
Resources required for the indicative content	
Equipment	▪ Mould, Painting machine, air compressor , wheelbarrow
Materials	▪ Bricks, cement, Betonite clay , Iron grate , Brick .paints
Tools	▪ Hoe, spade, trowel
Facilitation techniques and learning activities	▪ Lectures ▪ Demonstration and simulation ▪ Individual and group work ▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance based assessment ▪ Product based assessment ▪ Project based assessment ▪

Integrated/Summative assessment (For specific module)

Integrated situation

REMA / Kayonza Branch has realized the higher rate of deforestation and one of highlighted root-cause is excessive firewood consumption and this may result into environmental impact not only upon Kayonza population but also the whole country / region. Therefore; hand in hand with RE; they are hiring a technician in the field of Renewable Energy who is competent with hands on skills and able to solve the same issues.

As an Improved cooking stove installer you are requested to:

- Fabricate and test an improved cooking metal stove
- Fabricate and test an improved cooking bricks stove
- To ensure that the stoves use effectively the fuel for boiling water
- To be able to conduct stove test

Note: This test should be conducted within one day **(12** hours) for quality assurance of test results

Resources

Tools	Hearing machine, riveting machine , welding machine, Mould
Equipment	Metal sheet, Bolt, Nuts, Nails, Cutting wheel, Clay, cement, bricks, paint, tiles. Bricks, cement, Betonite clay , Iron grate , Brick .paints
Materials/ Consumables	Measurement tape, Notebook / Pen, Personal Protective Equipment Cross hammer, scissor. Hoe, spade, trowel

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: **(20%)**	1.1. The drawing details are properly interpreted and Materials are grouped by category according to their use	Drawing is interpreted			
		material grouped			
	1.2. Materials, equipment and tools are properly selected	Adequate Tools are selected			
		Adequate materials are selected			
		adequate equipment are Selected			
Learning outcome 2: **(40%)**	2.1. The dimensions are precisely taken , correctly marked and cut sheet metal as per drawing	Dimensions taken			
		Dimensions marked			
		Sheet metal cut			
		Sheet metal edge prepared			

	2.2. The outer cylinder is fabricated correctly according to design	Sheet metal bent			
		out cylinder assembled			
	2.3. The insulation and liner are embedded in the outer cylinder as per design	insulation prepared and placed in outer cylinder			
		liner fixed			
	2.4. The stove are properly painted and tested according to the standards	Painting completed			
		testing performed			
Learning outcome 3: **(40%)**	3.1. Materials and tools for brick stove construction are properly prepared	Materials prepared			
		Tools prepared			
	3.2. The working area for brick stove construction is correctly set up	working area selected			
		working area cleaned			
	3.3. Build the elevation and combustion chamber and chimney	Elevation built			
		Combustion chamber built			
		chimney built			
	3.4. Plaster the stove and testing according to the standards	plastering completed			
		Testing performed			
Total marks					**100**
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

References:

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