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Solid biomass cookstoves — Specification

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In order to match with technological development and to keep continuous progress in industries, Standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS290 was prepared by a Joint Technical Committee RSB/TC 49, *Renewable energy*, RSB/TC 10, *Electrical installation and protection against electrical shock* and RSB/TC 50, *Electrical generation, transmission and distribution systems*.

In the preparation of this standard, reference was made to the following standards:

- 1) KS 1814-1: 2005, *Biomass stoves — Performance requirements and test methods — Part 1: Household biomass stoves*
- 2) US 761: 2007, *Energy efficiency stoves — Household biomass stoves — Performance requirements and test methods*
- 3) ISO 19867-1:2018, *Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols — Part 1: Standard test sequence for emissions and performance, safety and durability*
- 4) ISO/TR 19867-3: 2018, *Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols — Part 3: Voluntary performance targets for cookstoves based on laboratory testing*

The assistance derived from the above source is hereby acknowledged with thanks.

This third edition cancels and replaces the second edition (RS 290: 2016), [clauses 2, 3, 4 and 6 were revised. Table 1 has been updated and annexes A, B, C, D, E, F were deleted.

Committee membership

The following organizations were represented on the Technical Committee on Joint Technical Committee RSB/TC 49, *Renewable energy*, RSB/TC 10, *Electrical installation and protection against electrical shock* and RSB/TC 50, *Electrical generation, transmission and distribution systems* in the preparation of this standard.

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Introduction

This Rwanda standard is intended for use to set performance requirements for cookstoves used primarily for cooking or water heating. Its purpose is to help producers and users to reduce the detrimental impact on environment and health of traditional cooking practices with the view to improve livelihood of citizens. The additional general description of ceramic liner cookstove is provided in Annex A as informative information to help local producers in manufacturing process.

This standard was developed to improve the quality of cookstoves on the market and was developed from best practices from existing cookstoves available on market which comply with minimum technical conditions as set by ISO and regional standards.

Solid biomass cookstoves — Specification

1 Scope

This Draft Rwanda Standard specifies requirements sampling and test methods for solid biomass cookstoves.

The standard is applicable to cookstoves used primarily for domestic and small-scale institutional cooking or water heating excluding stoves used primarily for space heating.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

RSISO 19867-1, *Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols — Part 1: Standard test sequence for emissions and performance, safety and durability*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1

cookstove

apparatus which is used to cook food and/or provide warmth and/or boil water through the conversion of biomass, typically through combustion

3.2

biomass

material of biological origin excluding embedded in geological formations and/or fossilized

3.3

maximum cooking power

highest cooking power for which a cookstove is designed, in kW

3.4

minimum cooking power

lowest cooking power for which a cookstove is designed, in kW

3.5

organic carbon

carbonaceous material in which the carbon is chemically bonded to hydrogen and possibly also oxygen, nitrogen, sulphur or other elements

3.6

particulate matter

solids and liquids of a sufficiently small size to be suspended in air

3.7

PM2.5

fine particulate matter such that the aerodynamic diameter of the particles is less than or equal to 2.5 µm

3.8

combustion efficiency

proportion of latent heat in a fuel transferred as heat to a working fluid (water)

3.9

thermal efficiency

ratio of useful energy delivered to fuel energy used

3.10

Water Boiling Test

test in which the performance of a stove is evaluated through the heating of a known quantity of water across a specified range of temperature following a defined protocol

3.11

black carbon (BC)

particulate carbonaceous material, typically the product of combustion that comprises primarily carbon

3.12

durability

ability of a cookstove to continue to be operated for an extended period safely and with minimal loss of performance under conditions typical of those found in the target community

3.13

safety

ability of a cookstove to be operated at an acceptable level of risk of harm

4 Requirements**4.1 General requirements**

4.1.1 All component parts of solid biomass cookstoves shall be made of non-corroding material or protected against corrosion by a suitable anticorrosion coating.

4.1.2 The solid biomass cookstoves shall use improved technologies to yield low emissions and high level of efficiency, durability and safety.

4.1.3 The solid biomass cookstoves shall be evaluated based on performance in the areas of fuel efficiency, emissions of fine particulate matter (PM 2.5) and carbon monoxide (CO), indoor emissions (particulate matter 2.5 and carbon monoxide), black carbon content, durability and safety and each area shall be ranked separately.


4.1.4 The cookstove shall be supplied with user guide in at least one of three official languages used in Rwanda

4.2 Specific requirements**4.2.1 Emissions, performance, and safety requirements**

4.2.1.1 Emissions shall be measured for the qualitative and quantitative determination of pollutant-emitting sources to ensure that the pollution is within acceptable limits as given in Table 1.

Table 1 — Requirements for cookstoves performance

	Tier	Thermal efficiency %	Emissions		Safety (score) ^a	Durability (score) ^b
			CO g/MJ	PM _{2.5} mg/ MJ		

<p>Better Performance</p> 	5	≥50	≤3,0	≤5	≥95	<10
	4	≥40	≤4.4	≤62	≥86	<15
	3	≥30	≤7.2	≤218	≥77	<20
	2	≥20	≤11.5	≤481	≥68	<25
<p>^a Safety protocols (see ISO 19867-1:2018, Clause 7) cover solid-fuel stoves and solar cookers only</p> <p>^b Durability protocols (see ISO 19867-1:2018, Clause 8) evaluate common material failures in biomass cookstoves. The protocol is not comprehensive of all failures that might be found in the field, nor are the tests found in the durability protocol applicable for all cookstoves. Instead, the durability protocol seeks to cover the most prevalent durability concerns found across a range of cookstove technologies and construction materials.</p>						

4.2.1.2 Cookstove performance (thermal efficiency and durability) and safety requirements shall be within the limits given in Table 1.

4.2.1.3 Instruments used for measuring gaseous pollutant concentrations shall be calibrated at the beginning and end of each day of testing with certified calibration gases. Calibrations shall be documented.

4.2.1.4 All cookstoves shall be at least be classified in one of the three categories given in Table 1.

4.2.1.5 After testing, the test report shall indicate the type of the tested cookstoves as given in Table 1.

5 Fuel

The solid biomass fuel shall comply with the relevant standards.

6 Marking

The marking shall be done either by painting or by using tags. All solid biomass cookstoves shall be indelibly and legibly marked with the following information in at least one of the three official languages used in Rwanda and shall be placed in a clear location on the cookstove:

- a) manufacturer's name or trademark;
- b) batch number;
- c) country of origin;
- d) name of the product.

Public review Draft

Price based on 4 pages

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