
**Clean cookstoves and clean cooking
solutions — Harmonized laboratory
test protocols —**

**Part 1:
Standard test sequence for emissions
and performance, safety and
durability**

*Fourneaux et foyers de cuisson propres — Protocoles d'essai en
laboratoire harmonisés —*

Partie 1: Séquence générale d'essais en laboratoire



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 www.iso.org/directives.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received www.iso.org/patents.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 285, *Clean cookstoves and clean cooking solutions*.

A list of all the parts in the ISO 19867 series can be found on the ISO website.

Introduction

This document is intended for use as laboratory measurement procedures to determine performance for cookstoves used primarily for cooking or water heating. Its purpose is to provide metrics that can be used to indicate a cookstove's performance under controlled conditions. This document provides a standard test sequence that can be used to compare the performance of various cookstove types, cookstove fuels, and cooking practices under controlled laboratory test conditions, as specified in this document.

This document was developed to achieve two goals:

- a) greater alignment in methodology and metrics around the world, and
- b) adaptation of methodology and metrics to the wide variety of cookstove types, cookstove fuels, and cooking practices.

For the purpose of this document, the intended user group refers to the approximately 2,8 billion people worldwide who are currently cooking with open fires or rudimentary stoves.

For evaluation of the performance and predicted outcomes of a cooking system in the field [comprising cookstove(s), fuel(s), cooking vessel(s), kitchen, ventilation, and user(s)], ISO 19869¹⁾ applies.

This document was developed from best practices from existing cookstove testing protocols, the experience of cookstove testing centres in many countries, and standards and testing methodology in related sectors.

Air pollutant emissions results are expressed in units of mass of pollutant per useful energy delivered and represent the mass of emissions per unit of cooking energy delivered. Emission results are also expressed in units of mass of pollutant per time and represent the mass rate of emission per unit time. Procedures for determining emissions require a complex set of individual measurements, rather than a single measured value. Thus, the results obtained depend as much on the procedure used to perform the measurements as they depend on the cookstove and the test method. The procedure used to perform the complex set of individual measurements is critical to obtaining the results.

Energy efficiency results are expressed as thermal efficiency. Cooking power results are expressed in units of watts.

Safety and durability results are expressed as a points-based rating system to enable individual countries and organizations to select levels based on their priorities. Durability methods are intended to evaluate the aspects of cookstove designs that can affect usable life and consumers' perceptions of quality. Durability testing methods include evaluation of extended runs, quenching, external and internal impacts, coating adhesion, corrosion, and material failure temperature.

1) In preparation.

Clean cookstoves and clean cooking solutions — Harmonized laboratory test protocols —

Part 1: Standard test sequence for emissions and performance, safety and durability

1 Scope

This document is applicable to cookstoves used primarily for cooking or water heating in domestic, small-scale enterprise, and institutional applications, typically with firepower less than 20 kW and cooking vessel volume less than 150 l, excluding cookstoves used primarily for space heating. For solar cookstoves, the provisions of this document are applicable only for evaluating cooking power, safety, and durability. Solar cookstoves have zero on-site emissions, and their cooking power can be determined according to ASAE S 580.1. This document does not cover electric stoves. Safety evaluation of electric stoves can be found in IEC 60335-2-6[62].

This document specifies laboratory measurement and evaluation methods for

- a) particulate and gaseous air pollutant emissions,
- b) energy efficiency,
- c) safety, and
- d) durability of cookstoves.

This document does not include evaluation of off-gassing from manufacturing oils, coatings, adhesives, and other materials (which can be found in ISO 10377 and ISO 14159). This document does not include evaluation of safety for cookstoves designed to burn a liquid and/or gaseous fuel, such as LPG (liquefied petroleum gas), alcohol, plant oil, kerosene, etc. Safety evaluation of gas-fuelled cookstoves can be found in ISO 23550 and ISO 23551 (all parts). This document does not include durability evaluation of rechargeable batteries in fan-assisted cookstoves. This document provides a standard test sequence to establish international comparability in measurement of cookstove emissions and efficiency. Guidelines for reporting results from the laboratory measurement and evaluation methods are described. For cookstoves used in applications covered by additional requirements (e.g., local air quality and safety regulations), additional test conditions and special evaluation methods may apply.

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.

ASAE S580.1. Testing and Reporting Solar Cooker Performance, *American Society of Agricultural and Biological Engineers*. Available from <https://www.asabe.org/media/200979/s580.1.pdf>

3 Terms and definitions

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