

International Workshop Agreement

IWA 11

Guidelines for evaluating cookstove performance

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Lignes directrices pour évaluer les performances d'une table de cuisson





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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). ISO's technical work is normally carried out through ISO technical committees in which each ISO member body has the right to be represented. International organizations, governmental and nongovernmental, in liaison with ISO, also take part in the work.

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An International Workshop Agreement is reviewed after three years, under the responsibility of the member body designated by the ISO Technical Management Board, in order to decide whether it will be confirmed for a further three years, transferred to an ISO technical body for revision, or withdrawn. If the International Workshop Agreement is confirmed, it is reviewed again after a further three years, at which time it must be either revised by the relevant ISO technical body or withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO should not be held responsible for identifying any or all such patent rights.

International Workshop Agreement IWA 11 was approved at a workshop organized by the Partnership for Clean Indoor Air (PCIA) and the Global Alliance for Clean Cookstoves, in association with the American National Standards Institute (ANSI), and held in The Hague, Netherlands, in February 2012.

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Workshop resolutions

Resolution 1

The International Workshop on Cookstoves recognizes that the Volunteers in Technical Assistance Water Boiling Test version 4.1.2 (VITA WBT 4.1.2) protocol (see Reference [2]) referenced in this International Workshop Agreement is not the only valid protocol for rating cookstove performance in the laboratory.

As such, the International Workshop on Cookstoves recommends that:

- a) new protocols be developed and/or current protocols be updated to more adequately address all stove and fuel types (e.g. cooking stoves also used for heating, plancha stoves/griddle stoves, batch-loaded stoves, charcoal stoves, double pot stoves and solar cookers);
- b) tier level equivalence to those used in this International Workshop Agreement for the VITA WBT 4.1.2 protocol be developed for any protocols created or adapted (e.g. References [4] and [5]);
- c) research be conducted for high priority initiatives, such as coupling lab and field testing, improving indoor emissions protocols, climate change impacts, and developing a pool of resources for testing stoves;
- d) all protocols be rigorously evaluated by an independent, technically qualified group; and
- e) the acceptability of a protocol for a particular stove and tier designation be determined by the ability of the test procedure to repeat the performance metric within one-third of the distance between tiers, under conditions that are consistent with the test specification.

Resolution 2

The International Workshop on Cookstoves recognizes that laboratory testing may not fully reflect performance as seen in the field, as performance is dependent on many factors (such as user behaviour, cultural acceptance and operating conditions), and it is critical that these factors be incorporated in future standards and protocols.

Resolution 3

The full range of exposure to household air pollution is currently being compiled by the World Health Organization (WHO) in new indoor air quality guidelines for household fuel combustion (due to be published in 2013). The International Workshop on Cookstoves recommends that the evidence of health risks across these guidelines be reviewed to ensure consistency with future standards or International Workshop Agreements.

Resolution 4

The International Workshop on Cookstoves recommends that a performance indicator (and corresponding protocols) for durability be developed and included in a future standard or International Workshop Agreement. In addition, the International Workshop on Cookstoves recommends further research be conducted and protocols be developed as needed to adequately evaluate the safety of all stove types and fuels (e.g. solar, kerosene, propane and solid fuel).

Resolution 5

The International Workshop on Cookstoves recommends that emissions relevant to health, environment (ambient air quality and climate) and performance, in addition to those currently addressed in this International

Workshop Agreement, be addressed in a future standard or International Workshop Agreement, as data becomes available.

Resolution 6

The International Workshop on Cookstoves recognizes that the quality and type of fuel used by a testing centre may impact the emissions of a cookstove. Because of that, the International Workshop on Cookstoves recommends that testing centres document the key physical and operational characteristics (e.g. fuel, moisture content, pot size and shape) of the system.

Introduction

Nearly half of the world population – three billion people in the developing world – cooks their food by burning coal and biomass, including wood, dung and crop residues over open fires or on rudimentary, often unvented stoves. Indoor burning of these solid and liquid fuels releases dangerous particulate matter, carbon monoxide and other toxic pollutants. This practice can lead to indoor air pollution levels that are 20 to 100 times greater than the air quality guidelines of the World Health Organization (WHO) and release greenhouse gases and black carbon into the environment. WHO estimates that nearly two million people, primarily women and children, die prematurely each year from exposure to indoor smoke from these cooking practices. Open fires and rudimentary cookstoves may also increase pressures on local environmental resources (e.g. forests, habitat) and contribute to climate change at regional and global levels.

The Partnership for Clean Indoor Air (PCIA) and the Global Alliance for Clean Cookstoves are working with more than 550 partners in 117 countries¹⁾ to achieve the adoption of 100 million clean and efficient stoves and fuels by 2020. Developing globally recognized standards that are widely accepted by the stove community and adopted by country governments could spur wider deployment of clean cookstoves in a number of ways, including defining what an “improved cookstove” is for users, stove makers and policy makers, and enabling the rating of stoves by efficiency, safety and cleanliness (particulate matter and carbon monoxide emissions), while allowing for differences in local conditions and user behaviour.

National performance-based standards have been developed and implemented in a few countries, but no international standard has been developed that contains commonly agreed upon and accepted criteria by which to define “clean” with regard to cookstoves. Such an international standard would significantly enhance efforts to see clean cookstoves adopted at scale.

This International Workshop Agreement serves as a guideline for policy-makers, investors, manufacturers and others in the cookstoves community, and it will inform future work required in developing new or revised internationally agreed upon cookstove standards and protocols.

1) A full list of partner organizations of the PCIA is available at: <http://www.pciaonline.org/partners/search>.

A full list of the partner organizations of the Global Alliance for Clean Cookstoves is available at: <http://cleancookstoves.org/the-alliance/partners>.

Guidelines for evaluating cookstove performance

1 Scope

This International Workshop Agreement provides a framework for rating cookstoves against tiers of performance for a series of performance indicators, including

- fuel use (efficiency),
- emissions (carbon monoxide and particulate matter 2,5),
- indoor emissions (carbon monoxide and particulate matter 2,5), and
- safety.

This International Workshop Agreement does not select a single laboratory protocol to determine cookstove performance. Instead, it enables stove testers to use laboratory protocols most appropriate for the stove and performance indicator being tested. Tiers of performance for each protocol chart all stove test results on the same page, in order to ensure equivalent results, regardless of protocol used.

2 Terms and definitions

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

2.1

air exchange rate

rate at which the air within a defined space (normally a room or house) is replaced, usually expressed as air changes per hour

2.2

batch-loaded stove

stove in which fuel is loaded once per burn cycle

2.3

biomass stove

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

2.4

Biomass Stove Safety Protocol

specific methodology for evaluating the safety of a stove, developed at Iowa State University

NOTE See Reference [1].

2.5

constant volume pump

device which repeatedly moves a standard volume of fluid (liquid or gas)

2.6

dilution tunnel

device in which air is mixed with an emissions stream in a known ratio