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Fuel cell technologies –
Part 9-102: Evaluation methodology for the environmental performance of fuel cell power systems based on life cycle thinking – Product category rules for environmental product declarations of stationary fuel cell power systems and alternative systems for residential applications

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ELECTROTECHNICAL
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FOREWORD

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IEC TS 62282-9-102 has been prepared by IEC technical committee 105: Fuel cell technologies. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

DTS	Report on voting
105/797/DTS	105/813A/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 62282 series, published under the general title *Fuel cell technologies*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

In developing new or improved products, manufacturers pursue environmentally conscious designs and evaluate their efforts, for example, by adopting a life cycle assessment (LCA) approach, in order to improve the environmental performance and communicate it to consumers.

This part of IEC 62282 addresses core product category rules (PCR) for characterizing the environmental performance of stationary fuel cell combined heat and power (CHP) systems (defined as: generator systems that use one or more fuel cell stack(s) to generate electric power and heat) and alternative heat (and power) systems for residential applications based on life cycle thinking for communication to consumers. They primarily serve heating purposes. Alternative micro combined heat and power production (μCHP) systems (e.g. Stirling or internal combustion engines) and residential heating systems are also covered. All of these heating systems can be complemented with a peak boiler and/or a hot water storage tank. This shows that there are multiple possibilities to combine stationary fuel cell CHP systems and alternative heat (and power) systems in residential applications. This document is therefore written in a way to allow for an environmental product declaration (EPD) for each individual heat-related device to be established. If combined in a given home, this document also provides requirements and guidance on how to derive specific information on their joint environmental impacts based on the individual EPDs. Because the environmental implications of local infrastructures are known neither to the manufacturer nor to the installer, local infrastructures are not considered (i.e. the domestic heat distribution system and infrastructures for fuel supply (e.g. municipal natural gas network) or fuel storage (e.g. oil tank in situ or in the municipality)). District heating is beyond the scope of this document.

According to ISO 14025, a PCR is a set of specific rules, requirements and guidelines for developing Type III environmental declarations of one or more product categories, providing quantified environmental data. The PCR, and the resulting EPDs, are based on life cycle thinking in order to avoid an incomplete assessment of the systems in question and to identify environmental burden shifting among environmental impact categories and life cycle stages. The EPDs are accordingly generated using the principles, framework, methodologies and practices established by the ISO 14040 series of standards (i.e. ISO 14040 and ISO 14044).

The overall goal of the EPD of stationary fuel cell CHP systems and alternative systems for residential applications is to encourage the demand for, and supply of, those products that cause less burden on the environment, through communication of verified and accurate information that is not misleading, thereby stimulating the potential for market-driven continuous environmental improvement. This document focuses on residential applications, but can also be applied to applications in the tertiary sector.

This document is intended to be used by manufacturers of heat-related devices (including CHP generators) on a voluntary basis. The information provided is then used by consumers or installers.

The installation of a heating system (including CHP systems) individually or in combination with other heat-related devices (e.g. µCHP combined with a peak boiler and a hot water storage tank) depends on the heating demand of the consumer in a given home (in turn depending on e.g. the climate, and the size and insulation level of the building) and also on the consumer's technical preferences (e.g. CHP versus only heating, fuel cell CHP systems versus other systems). The environmental performance of an individual heat-related device or a combination thereof will therefore depend on the specific setting that the manufacturer cannot anticipate in the EPD of its heat-related device. It will, therefore, be the task of the installer of a heat-related device (including CHP generators), or a combination thereof, to adapt or integrate the information of the EPD(s) of the heat-related device(s) in order to provide information on the environmental performance of the overall heating systems that can potentially be installed in a given home. Neither will the manufacturers be necessarily able to know to which extent the devices run on biofuels (including on which kind of biofuel) and in particular whether the biofuels used can be regarded as carbon neutral. Therefore, the case of carbon neutrality of biofuels is not quantitatively dealt with in the EPD. However, it is discussed in the EPD so that the consumer or installer of a heat-related device can take potentially existing carbon neutrality into account.

NOTE At the time of publication of this document, a new ISO standard on "carbon neutrality" (ISO 14068) is under development.

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1 Scope

This part of IEC 62282 provides a set of specific rules, requirements and guidelines (i.e. so-called product category rules (PCR) according to ISO 14025 and thus in line with ISO 14040 and ISO 14044) for characterizing the environmental performance of stationary fuel cell combined heat and power (CHP) systems, and alternative systems for residential applications based on life cycle thinking primarily for communication to consumers. The environmental performance of a system is communicated to the consumer and the installer by means of an environmental product declaration (EPD).

This document covers stationary fuel cell CHP systems and alternative heat (and power) systems for residential applications that primarily serve heating purposes. The systems can be complemented with a hot water storage tank and one or more additional heat generators. The systems are connected to the electricity grid. The environmental performance is characterized in an EPD for each individual heat-related device or CHP generator separately. This document also describes how the environmental performance of a given combination of heat-related devices (including CHP generators) is characterized based on the environmental performance of its individual components. The domestic heat distribution system, district heating, or local infrastructures for fuel supply or for fuel storage are not considered.

This document focuses on residential applications, but can also be used to assess applications in the tertiary or service sector.

This document does not override, or in any way change, legally required environmental information, claims or labelling, or any other applicable legal requirements.

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.

ISO 14020:2000, *Environmental labels and declarations – General principles*

ISO 14021:2016, *Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)*

ISO 14025:2006, *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*