105/70/NP

NEW WORK ITEM PROPOSAL

	Proposer JAPAN	Date of proposal March - 2004
	TC/SC TC 105	Secretariat Germany
Classification according to IEC Directives Supplement, Table 1	Date of circulation 2004-03-19	Closing date for voting 2004-06-18

A proposal for a new work item within the scope of an existing technical committee or subcommittee shall be submitted to the Central Office. The proposal will be distributed to the P-members of the technical committee or subcommittee for voting, and to the O-members for information. The proposer may be a National Committee of the IEC, the secretariat itself, another technical committee or subcommittee, an organization in liaison, the Standardization Management Board or one of the advisory committees, or the General Secretary. Guidelines for proposing and justifying a new work item are given in ISO/IEC Directives, Part 1, Annex C (see extract overleaf). **This form is not to be used for amendments or revisions to existing publications.**

The proposal (to be completed by the proposer)

Title of proposal

Micro Fuel Cell Power Systems – Performance

☒ Standard	☐ Technical Specification	☐ Publicly Available Specification

Scope (as defined in ISO/IEC Directives, Part 2, 6.2.1)

International standard providing testing method for performance evaluation based requirement for micro fuel cell power systems such as laptops cell phones and PDAs. Performance evaluation will include such as characteristics of output power, fuel consumption, operational durability,mechanical durability, starting up time, load responding, etc. It will exclude the field of the safety.

Purpose and justification, including the market relevance and relationship to Safety (Guide 104), EMC (Guide 107), Environmental aspects (Guide 109) and Quality assurance (Guide 102) . (attach a separate page as annex, if necessary)

To harmonize requirements from EU, Asia and North America using European Directives, Japanese Requirements, and USA standards to establish a minimum criteria for acceptable design, construction and use. This standard will reduce technical barriers to trade between these regions, reduce the testing costs, and avoid modifications to manufacturers' standard units for different regions . This standard of testing method will be for mass production and different from limited production.

Target date	for first CD 2005-06	for IS 2007-12
Estimated number of meetings 10	Frequency of meetings: 3 per year	Date and place of first meeting: Tentatively June, 2004 Yokohama , Japan
Proposed working methods	☒ E-mail	☒ ftp

Relevant documents to be considered

Micro Fuel Cell Power System –Performance Evaluation
(See attached)

Relationship of project to activities of other international bodies

None

Liaison organizations	**Need for coordination within ISO or IEC**
None	None

Preparatory work

Ensure that all copyright issues are identified. Check one of the two following boxes

☒ A draft is attached for vote and comment ☐ An outline is attached

We nominate a project leader as follows in accordance with ISO/IEC Directives, Part 1, 2.3.4 (name, address, fax and e-mail): Hiroshi YOKOYAMA

Corporate R&D Division, Hitachi, Ltd.,
4-6, Kandasurugadai,
Chiyoda-ku, Tokyo
101-8010 JAPAN
e-mail : yokoyama@gm.hqrd.hitachi.co.jp

Concerns known patented items (see ISO/IEC Directives, Part 2)	**Name and/or signature of the proposer**
☐ yes If yes, provide full information as an annex ☒ no	Mr. Kazuo Koseki

Comments and recommendations from the TC/SC officers

1) Work allocation
☐ Project team ☒ New working group ☐ Existing working group no:

2) Draft suitable for direct submission as
☐ CD ☐ CDV ☐ Publication as a PAS

3) General quality of the draft (conformity to ISO/IEC Directives, Part 2)
☐ Little redrafting needed ☐ Substantial redrafting needed ☒ no draft (outline only)

4) Relationship with other activities
In IEC
TC105 Micro Fuel Cell power Systems - Safety

In other organizations

Remarks from the TC/SC officers

Secretary of IEC/TC 105 (Andreas Piepereit):
It has been decided during the IEC/TC105 San Diego plenary meeting in June 2003 to launch a separate NWIP (initiator: Japan) for performance aspects of micro fuel cells. Due to the fact that commercial micro fuel cell products will be available in the near future according to market information, the standardization of such products is urgently needed to support the commercialisation. All IEC/TC105 member countries are requested to support this activity by actively participating in working group meetings.

Elements to be clarified when proposing a new work item

Title

Indicate the subject matter of the proposed new standard.

Indicate whether it is intended to prepare a standard, a technical report or an amendment to an existing standard.

Scope

Give a clear indication of the coverage of the proposed new work item and, if necessary for clarity, exclusions.

Indicate whether the subject proposed relates to one or more of the fields of safety, EMC, the environment or quality assurance.

Purpose and justification

Give details based on a critical study of the following elements wherever practicable.

a) The specific aims and reason for the standardization activity, with particular emphasis on the aspects of standardization to be covered, the problems it is expected to solve or the difficulties it is intended to overcome.

b) The main interests that might benefit from or be affected by the activity, such as industry, consumers, trade, governments, distributors.

c) Feasibility of the activity: Are there factors that could hinder the successful establishment or general application of the standard?

d) Timeliness of the standard to be produced: Is the technology reasonably stabilized? If not, how much time is likely to be available before advances in technology may render the proposed standard outdated? Is the proposed standard required as a basis for the future development of the technology in question?

e) Urgency of the activity, considering the needs of the market (industry, consumers, trade, governments etc.) as well as other fields or organizations. Indicate target date and, when a series of standards is proposed, suggest priorities.

f) The benefits to be gained by the implementation of the proposed standard; alternatively, the loss or disadvantage(s) if no standard is established within a reasonable time. Data such as product volume of value of trade should be included and quantified.

g) If the standardization activity is, or is likely to be, the subject of regulations or to require the harmonization of existing regulations, this should be indicated.

If a series of new work items is proposed, the purpose and justification of which is common, a common proposal may be drafted including all elements to be clarified and enumerating the titles and scopes of each individual item.

Relevant documents

List any known relevant documents (such as standards and regulations), regardless of their source. When the proposer considers that an existing well-established document may be acceptable as a standard (with or without amendments), indicate this with appropriate justification and attach a copy to the proposal.

Cooperation and liaison

List relevant organizations or bodies with which cooperation and liaison should exist.

Preparatory work

Indicate the name of the project leader nominated by the proposer.

"Micro Fuel Cell Power System – Performance Evaluation"

Contents

Introduction

International standards are needed in order to avoid trade barriers. The demand for fuel cells with state-of-the-art technology has been increasing dramatically in recent years. The fuel cell module is a critical component in fuel cell systems such as laptop computers, cell phones, digital cameras, and PDAs. Some of these fuel cell systems have built-in fuel cell power units, and others have external ones.

This international standard is to describe the performance evaluation methods for built-in or external fuel cell module so called micro fuel cell power system, which is solid type polymer electrolyte fuel cells (PEFC) or direct methanol type fuel cell (DMFC) to be supplied with methanol or methanol solution or hydrogen as fuel, all with 60V in output voltage and 240 VA or less in output power. The performance evaluation including for power characteristics and the testing methods are described in this standards.

1.Scope

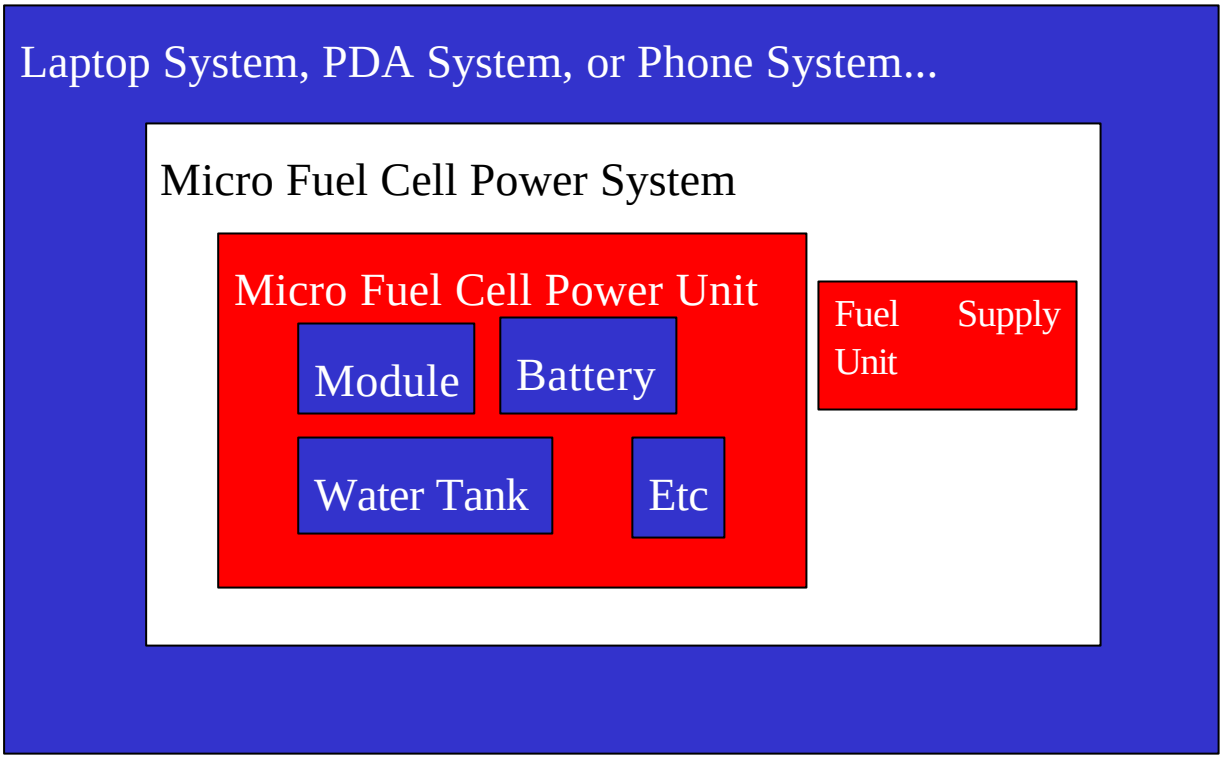
International standard providing testing method for performance evaluation based requirement for micro fuel cell power systems, such as laptops cell phones and PDAs.

Performance evaluation will include such as characteristics of output power, fuel consumption, operational durability, mechanical durability, load responding, etc.

It will exclude the field of the safety.

Micro fuel cell systems under this international standard should have the following functional arrangement as shown in Figure 1.

Figure 1. Functional arrangement in scope of standard



2.Reference(? ? ? ?)

Measurements

IEC60051 : 1984

IEC60359 : 1987

IEC60687 : 1992

IEC60688 : 1992

IEC61028 : 1991

IEC61036 : 1990

IEC61143 : 1992

3.Defintion

Small low-voltage, low-power fuel cell systems that include the fuel container/cartridge and are connected to hand-held or wearable electronic devices by flexible cords and plug arrangements or termination connectors integrated into the casing of the electric devices. These DC units power electric devices such as laptops, cell phones and PDAs.

4.General Principle

4.1 Surroundings of the Measurement

Unless otherwise specified, performance shall be measured in a static atmosphere at a certain humidity

to be specified under this standard. The ambient temperature for the micro fuel system to be measured shall be 20 ± 5? .

4.2 Measurement Items and Accuracy

The measurement items and measurement accuracy under this standard shall be as follows:

(a) Voltage ± 1%
(b) Current ± 1%
(c) Time ± 1%
(d) Mass ± 1%
(e) Temperature ± 2?
(f) Humidity
(g) Flow volume rate
(h) Pressure

4.3 Measuring instruments

The measuring instruments shall be selected in accordance with the range of values to be measured. The instruments shall be calibrated regularly in order to maintain the level of accuracy described below.

4.3.1 Voltage

The instrument to be used for current measurement shall be as provided in IEC60051-2 for analog devices and in IE xxxxx for digital devices.

4.3.2 Current

The instrument to be used for voltage measurement shall be as provided in IEC60051-2 for analog devices and in IE xxxxx for digital devices.

The accuracy specified herein shall also be maintained for the assembling of a current meter, shunt resistor, and electric wirings.

4.3.3 Time

The measuring instruments for time shall have a margin of within ± 1 sec/hour or better.

4.3.4 Weight

The measurement of mass shall be performed in accordance with the government standard or the guideline of a trade association or organization of each country. Any organization that does not have a standard or guideline to refer to shouldl create one for their performance evaluation. The weight may be determined by calculations based on the measured volume and material's physical properties.

4.3.5 Temperature

The instruments for measuring temperature shall be as provided in IEC60051-1(all parts)JIS B 7411.

4.3.6 Humidity

ISO 4677-1 and ISO 4677-2 shall be referred for measurement of ambient humidity.

4.3.7 Flow rate

The measurement of volumetric flow rate shall be performed in accordance with the government standard or the guideline of a trade association or organization of each country. Any organization that does not have a standard or guideline to refer to shall create one for their performance evaluation. The volumetric flow rate may be determined by calculations based on the measured mass flow and material's physical properties.

4.3.8 Pressure

The measurement of pressure shall be performed in accordance with the government standard, industry guideline, or the guideline of the organization itself of each country. Any organization that does not have a standard or guideline to refer to shall create a pressure measurement standard or guideline for their performance evaluation.

5. Testing

5.1 Power Characteristics

5.1.1 Start-up Time

(1) This purpose pf this test is to verify the start-up time of micro fuel cell power unit.

(2) The time taken to reach the rated voltage from the time of switch-on, when under no load but the prescribed temperature and humidity conditions, shall be measured. The time taken to reach the rated output from the time of switch-on when connected to a prescribed load shall also be measured. The power output shall be calculated as voltage multiplied by current.

(3) The measurement environment shall be determined pursuant to 4.1; the parameters for measurement accuracy shall be pursuant to 4.2. Measuring instruments for voltage, current, and time shall be as provided in 4.3.1, 4.3.2, and 4.3.3 respectively.

5.1.2 Continuous Power Generation Test at Constant Current

(1) This purpose of this test is to verify the performance of micro fuel cell power unit in continuous generation at a constant current.

(2) The voltage shall be measured when the micro fuel cell module generates power continuously under fixed temperature and humidity conditions at the rated current specified by the manufacturer.

(3) The surroundings of the measurement, range of measurement accuracy, and measuring instruments should be as provided in 5.1.1.

5.1.3 Intermittent Power Generation Test

(1) This purpose of this test is to verify the performance of micro fuel cell unit in intermittent power generation.

(2) The output voltage shall be measured when the micro fuel cell module goes through a certain duration of cycles of power generation at the rated current for a certain period followed by a certain period of non-generation under fixed temperature and humidity conditions. The rated current, the duration of generation and non-generation per cycle, and the duration of cycles should be provided by the manufacturer.

(3) The measurement environment, range of measurement accuracy, and measuring instruments should be as provided in 5.1.1.

5.1.4 Power Generation Test under Load Change

(1) This purpose of this test is to verify the performance of micro fuel cell power unit when tit is subjected to certain reputation of load change pattern as specified.

(2) The voltage of the micro fuel cell system should measured when it is subjected to certain load cycles under fixed temperature and humidity conditions. The load change pattern and the duration of cycles shall be as specified by the manufacturer.

(3) The measurement environment, range of measurement accuracy, and measuring instruments should be as provided in 5.1.1.

5.1.5 Power Generation Test after Long Non-operation

(1) The purpose of this test is to verify the performance of micro fuel cell power unit when it is restarted for generation after a long period of non-operation.

(2) The output voltage of the micro fuel cell module shall be measured when it is restarted for generation after operation for a certain duration of time at the rated load under prescribed temperature and humidity conditions followed by a long period of non-operation. The rated load and the duration of pre-operation and non-operation should be specified by the manufacturer.

(3) The surroundings of the measurement, range for measurement accuracy, and measuring instruments should be as provided in 5.1.1.

5.1.6 Low and High Temperature Power Generation Tests

(1) This purpose of this test item is to verify the power generation performance of micro fuel cell power unit under low and high temperature conditions.

(2) The output voltage of the micro fuel cell module shall be measured when it generates power at the rated current under the temperature conditions of - 20? and + 40? .

(3) The measurement environment, range for measurement accuracy, and measuring instruments should be as provided in 5.1.1.

5.1.7 Power Generation Test under Different Humidity Conditions

(1) The purpose of this test is a to verify the performance of micro fuel cell power unit under different humidity condition.

(2) The output voltage shall be measured when the micro fuel cell module generates power at the rated current for a certain duration of time under high and low humidity conditions. The levels of humidity under high and low humidity conditions, rated current, and the duration of generation should be specified by the manufacturer.

(3) The range for measurement accuracy should be pursuant to 4.2; measuring instruments for voltage, current, and time should be pursuant to 4.3.1, 4.3.2, and 4.3.3 respectively; and, the measurement of humidity pursuant to 4.3.6.

5.1.8 Altitudes test

(1) The purpose of this test to verify the performance of micro fuel cell power generation of micro fuel cell power system under different pressures.

(2) A continuous power generation test at a constant current shall be performed in a certain reduced pressure, and the performance should be verified to be within the range for measurement accuracy when compared to that reduced pressure. The certain reduced pressure should be specified in manufacture's provision.

(3) The continuous generation test at a constant current should be conducted in accordance with 5.1.2.

5.1.9 EMI Noise Test

(1) The purpose of this test is to verify that micro fuelcell power system has no incorrect action due to EMI noise.

(2) This is to confirm that no incorrect action is caused to the micro fuel cell power system when it received rated EMI noise.

(3) A continuous generation test at a constant current should be conducted in accordance with 5.1.2. The rated EMI noise should be generated as per the provision of the manufacturer.

5.1.10 Vibration and Shock test

(1) The purpose of this test is to verify that micro fuel cell power system maintain its performance under vibrations or shock.

(2) The performance in the continuous generation test of the micro fuel cell power system at constant current should be verified to be remaining within the range for measurement accuracy under vibrations or shock.

(3) The vibration and shock test should conform to the UN and ICAO regulation on transportation and the standard for allowable items in passenger cabins by the IATA.

5.2 Fuel consumption efficiency

5.2.1 Fuel consumption

(1) The purpose of this test is measure the quantity of fuel consumed by micro fuel cell supply unit in micro fuel cell power unit when operated at the rated current continuously.

(2) The fuel consumption as found in the fuel supply unit, the voltage and the duration of generation of the micro fuel cell power unit should be measured when it generates power at the rated current specified by the manufacturer under a certain environment surroundings. The fuel consumption per unit time and the electrical energy per unit fuel mass based on the values should be calculated by the following equations.

$$\text{Fuel consumption per unit hour (g/h)} = \frac{\text{Fuel consumption (g)}}{\text{Hours of generation (h)}}$$

$$\text{Generated electrical energy per unit fuel mass (Wh/g)} = \frac{(A) \times (V) \times (h)}{\text{Fuel consumption (g)}}$$

Where, (A):Rated current
(V) Voltage:
(h) Hours of generation:

Provided, however, that the fuel mass herein means the mass of the so-called pure fuel components within the fuel.

(3) The surroundings of the measurement, range for measurement accuracy, and measuring instruments should be as provided in 5.1.1.

6. Labeling and Marking

The manufacturer shall clearly label its micro fuel cell power unit that it is in conformance with this standard. The label should include the following information and marked as per the manufacturer's specification.

- Name of manufacturer
- Year and month of manufacturing
- Reference standard no. (IECx x x x)
- Result of the performance evaluation which is useful to users
- Product life span based on the manufacturer's provision

7. Annex