

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fuel cell technologies – **STANDARD PREVIEW**
Part 6-300: Micro fuel cell power systems – Fuel cartridge interchangeability
(standards.iteh.ai)

Technologies des piles à combustible –
Partie 6-300: Systèmes à micro-piles à combustible – Interchangeabilité de la
cartouche de combustible





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2012 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.
If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.
Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,...).

Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 62282-6-300

Edition 2.0 2012-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fuel cell technologies – Part 6-300: Micro fuel cell power systems – Fuel cartridge interchangeability
(standards.iteh.ai)

Technologies des piles à combustible – Partie 6-300: Systèmes à micro-piles à combustible – Interchangeabilité de la cartouche de combustible

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE XE
CODE PRIX

ICS 27.070

ISBN 978-2-83220-555-6

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	10
3 Terms and definitions	10
4 Fuel connectors.....	13
4.1 Basic requirements.....	13
4.1.1 Safety.....	13
4.1.2 Safety of connectors during connecting, fueling and removing.....	14
4.2 Construction and actuation requirements.....	15
4.2.1 General	15
4.2.2 Connector sealing.....	15
4.2.3 Connector sequence.....	15
4.2.4 Mechanical keys	15
4.2.5 Material requirement.....	15
4.3 Interchangeable fuel connectors.....	15
4.3.1 General	15
4.3.2 Type A.....	16
4.3.3 Type B.....	23
4.3.4 Type C	30
4.3.5 Type D	36
4.3.6 Type E.....	42
4.4 Type tests for interchangeable fuel connectors.....	47
4.4.1 Test types	47
4.4.2 Mechanical strength requirement for interchangeable fuel connectors	48
4.4.3 Test parameters	48
4.4.4 Classification of cartridge size and connector strength	49
4.4.5 Test fixtures	49
4.4.6 Forces expected in normal operation and in foreseeable misuse (f_1 and f_2).....	50
4.4.7 Number of samples.....	51
4.4.8 Laboratory conditions	52
4.4.9 Type tests	52
5 Fuel cartridge	79
5.1 Fuel concentrations.....	79
5.2 Cartridge pressure.....	79
5.3 Cartridge capacity, size and shape.....	79
5.3.1 Cartridge size and shape.....	79
5.3.2 Cartridge capacity and usable fuel determination.....	82
5.4 Maximum discharge pressure	84
5.5 Fuel quality	87
5.5.1 General requirements	87
5.5.2 Fuel quality requirements	87
5.5.3 Test sample.....	88
5.5.4 Test procedure to measure the residue.....	88
5.5.5 Impurities test.....	89

5.5.6	Test set-up for impurities test with fuel cell operation	91
6	Marking	94
6.1	Cartridge marking	94
6.2	MFC power unit or electronic device marking	95
6.3	User information required in the manual or on the packaging	96
Annex A (informative)	Calculations of f_1 , f_2 , and maximum discharge pressure	97
Annex B (informative)	Test fixtures	100
Bibliography	103
Figure 1	– MFC power system block diagram	10
Figure 2	– Fuel cartridge types	12
Figure 3	– MFC power unit side connector design (cross-sectional view)	16
Figure 4	– MFC power unit side connector design (front-elevational view)	16
Figure 5	– Seal surface area design for MFC power unit side connector (cross-sectional view)	17
Figure 6	– Cartridge space for satellite cartridge (cross-sectional view)	18
Figure 7	– Cartridge space for insert cartridge (cross-sectional view)	19
Figure 8	– Mechanical key (wide and 2-key type)	20
Figure 9	– Mechanical key (narrow and 3-key type)	20
Figure 10	– Mechanical key variation with key number (front-elevational view)	20
Figure 11	– Connector retainer (unlocked)	22
Figure 12	– Connector retainer (maximum set-back: locked)	22
Figure 13	– MFC power unit side connector design (cross-sectional view)	24
Figure 14	– MFC power unit side connector design (front-elevational view)	24
Figure 15	– Cartridge space (cross-sectional view)	25
Figure 16	– Mechanical keys	26
Figure 17	– Connector retainer (cross-sectional view before connection)	28
Figure 18	– Connector retainer (front-elevational view before connection)	28
Figure 19	– Connector retainer (cross-sectional view when retained)	28
Figure 20	– Connector retainer (front-elevational view when retained)	28
Figure 21	– Connector retainer engaged (cross-sectional view)	29
Figure 22	– MFC power unit side connector design (cross-sectional view)	31
Figure 23	– MFC power unit side connector design (front-elevational view)	31
Figure 24	– Cartridge space (cross-sectional view)	32
Figure 25	– Mechanical key (cross-sectional view)	33
Figure 26	– Mechanical key (front-elevational view)	33
Figure 27	– Mechanical key variation with key number	33
Figure 28	– Connector retainer (cross-sectional view)	34
Figure 29	– MFC power unit side connector design (cross-sectional view)	36
Figure 30	– MFC power unit side connector design (front-elevational view)	36
Figure 31	– Cartridge space for insert cartridge (cross-sectional view)	37
Figure 32	– Mechanical key (cross-sectional view)	38
Figure 33	– Mechanical key (front-elevational view)	38
Figure 34	– Mechanical key variation with key number	39

Figure 35 – Connector retainer (cross-sectional view).....	40
Figure 36 – Connector retainer (front-elevational view).....	40
Figure 37 – MFC power unit side connector design.....	42
Figure 38 – Seal surface area design for MFC power unit side connector (cross-sectional view).....	43
Figure 39 – Cartridge space for satellite cartridge (cross-sectional view).....	44
Figure 40 – Cartridge space for insert cartridge (cross-sectional view).....	45
Figure 41 – Connector retainer.....	46
Figure 42 – Flow chart for connector type tests – Compression test for proper combination and correct orientation in normal operation on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	53
Figure 43 – Flow chart for connector type tests – Compression test for proper combination and incorrect orientation in normal operation on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	55
Figure 44 – Flow chart for connector type tests – Compression test for proper combination and incorrect orientation in foreseeable misuse on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	57
Figure 45 – Flow chart for connector type tests – Compression test for improper mechanical key combination in normal operations on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	59
Figure 46 – Flow chart for connector type tests – Compression test for improper mechanical key combination in foreseeable misuse on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	61
Figure 47 – Flow chart for connector type tests – Tensile test in normal operations on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	63
Figure 48 – Flow chart for connector type tests – Tensile test in foreseeable misuse on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	65
Figure 49 – Flow chart for connector type tests – Torsion test in normal operations on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	67
Figure 50 – Flow chart for connector type tests – Torsion test in foreseeable misuse on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	69
Figure 51 – Flow chart for connector type tests – Bending test in normal operations on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	71
Figure 52 – Flow chart for connector type tests – Bending test in foreseeable misuse on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	73
Figure 53 – Flow chart for connector type tests – Drop test in foreseeable misuse on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	76
Figure 54 – Flow chart for connector type tests – Vibration test in normal operations on a manufacturer’s cartridge or a manufacturer’s end use MFC device.....	78
Figure 55 – Prismatic cartridge.....	79
Figure 56 – Cylindrical cartridge.....	81
Figure 57 – Test diagram – Usable fuel measurement for pump-assisted discharging cartridge (option 1).....	83
Figure 58 – Test diagram – Usable fuel measurement for pump-assisted discharging cartridge (option 2).....	83
Figure 59 – Test diagram – Usable fuel measurement for non-pump assisted discharging cartridge.....	84
Figure 60 – Test diagram – Usable fuel measurement for pressurized cartridge.....	84
Figure 61 – Flow chart for maximum discharge pressure test.....	86
Figure 62 – Test apparatus.....	92

Figure 63 – Test cell construction drawing	92
Figure 64 – Exploded view of test cell	93
Figure 65 – Endplate and its flow channel design.....	93
Figure 66 – Types of fuel cartridges	95
Figure B.1 – Device test fixture for cartridge testing of 4.4.9	100
Figure B.2 – Device test fixture for cartridge testing of 5.3.2 and 5.4	101
Figure B.3 – Cartridge test fixture for device testing of 4.4.9	102
Table 1 – Dimension and tolerance for MFC power unit side connector.....	17
Table 2 – Dimension of space for satellite cartridge in MFC power unit.....	18
Table 3 – Dimension for insert cartridge space in MFC power unit	19
Table 4 – Key location and dimension with tolerance for mechanical key	21
Table 5 – Dimension and tolerance for connector retainer on the MFC power unit side	22
Table 6 – Dimension and tolerance for MFC power unit side connector.....	24
Table 7 – Dimension and tolerance	25
Table 8 – Key location and dimension with tolerance for mechanical key	26
Table 9 – Dimension and tolerance for connector retainer on the MFC power unit	29
Table 10 – Dimension and tolerance for MFC power unit side connector	31
Table 11 – Dimension and tolerance for cartridge space within MFC power unit.....	32
Table 12 – Key location and dimension with tolerance for mechanical key	34
Table 13 – Dimension and tolerance for the MFC power unit side connector retainer	35
Table 14 – Dimension and tolerance for MFC power unit side connector.....	37
Table 15 – Dimension and tolerance for the cartridge space in MFC power unit	38
Table 16 – Dimension and tolerance for mechanical key	38
Table 17 – Key location for mechanical key	39
Table 18 – Dimension and tolerance for the MFC power unit side retainer	41
Table 19 – Dimension and tolerance for MFC power unit side connector.....	43
Table 20 – Dimension of space for satellite cartridge in MFC power unit.....	44
Table 21 – Dimensions for insert cartridge space in MFC power unit.....	45
Table 22 – Dimension and tolerance for connector retainer on the MFC power unit side	46
Table 23 – Interchangeable fuel connector type tests.....	49
Table 24 – Classification of cartridge size and connector strength	49
Table 25 – Device test fixture for cartridge testing	50
Table 26 – Cartridge test fixture for device testing	50
Table 27 – External forces expected in normal operation and foreseeable misuse	51
Table 28 – Size and type of prismatic cartridge.....	80
Table 29 – Size and type of cylindrical cartridge	81
Table 30 – Test parameters for usable fuel determination	82
Table A.1 – Weight and size of typical cartridge.....	97
Table A.2 – Ergonomics data – Force by human hand or finger.....	97
Table A.3 – Forces f_1 and f_2 for type tests.....	98

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FUEL CELL TECHNOLOGIES –**Part 6-300: Micro fuel cell power systems –
Fuel cartridge interchangeability**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

International Standard IEC 62282-6-300 has been prepared by IEC technical committee 105: Fuel cell technologies.

This second edition cancels and replaces the first edition, published in 2009, and constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- a) The status of designs yet to be included in the standard is clarified.
- b) Type A to D interchangeable connectors are updated, and Type E is added.
- c) The procedures, criteria and figures of the type tests for interchangeable connectors are updated to ensure they produce accurate and consistent results.
- d) The fuel quality requirements are updated including the test procedures for residue and impurities.

The text of this standard is based on the following documents:

CDV	Report on voting
105/370/CDV	105/409/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

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

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

iTeh STANDARD PREVIEW (standards.iteh.ai)

[IEC 62282-6-300:2012](#)

<https://standards.iteh.ai/catalog/standards/sist/aef02a1-38e8-4828-b3ac-0a8038fdc004/iec-62282-6-300-2012>

INTRODUCTION

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning fuel connectors given in 4.3.1, 4.3.2, 4.3.3 and 4.3.4, patents concerning mechanical keys given in 4.2.3, and patents concerning fuel quality in 5.5.

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

- Hitachi, Ltd., 1-1, Omika-cho 7-chome, Hitachi-shi, 319-1292 Japan
- Toyo Seikan Kaisha, Ltd., 3-1 Uchisaiwaicho 1-chome, Tokyo 100-8522 Japan
- Toshiba Corporation, 1-1, Shibaura 1-chome, Tokyo 1005-8001 Japan
- Tokai Corporation, 3-4, Shimohara, Subashiri, Oyama-cho, Sunto-Gun, Shisuoka, 410-1431 Japan
- NEC Corporation, 7-1, Shiba 5-chome, Tokyo 108-8001 Japan
- Samsung SDI Co., Ltd., 575 Shin-dong, Yeongtong-gu, Suwan-si, Gyeonggi-do, 443-731, Korea.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

ISO (www.iso.org/patents) and IEC (<http://patents.iec.ch>) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

FUEL CELL TECHNOLOGIES –

Part 6-300: Micro fuel cell power systems – Fuel cartridge interchangeability

1 Scope

This part of IEC 62282 covers interchangeability of micro fuel cell (MFC) fuel cartridges to provide the cartridge compatibility for a variety of MFC power units while maintaining the safety and performance of MFC power systems. For this purpose, the standard covers fuel cartridges and their connector designs. Fuel type, fuel concentration and fuel quality are also covered. This standard also provides for the means to avoid the miss-connection of an improper fuel cartridge. Test methods for verifying the compliance with the interchangeability requirements for fuel and fuel cartridges are also provided in this standard.

IEC 62282-6-100 and IEC 62282-6-200 do not cover fuel cartridge or fuel from the cartridge. IEC 62282-6-300 describes the performance test methods of fuel cartridges, the fuel from the cartridge, and markings to realize the interchangeability of fuel cartridges. These include performance effect of fuel cartridges, such as fuel quality which may affect the performance of MFC power units and usable fuel volume from fuel cartridges.

A MFC power system block diagram is shown in Figure 1. MFC power systems and MFC power units are defined as those wearable or easily carried by hand, providing d.c. outputs that do not exceed 60 V and power outputs that do not exceed 240 VA. This standard covers the fuel cartridge for MFC power units, and the mechanical interface of connectors between fuel cartridges and MFC power units. The main body of this standard includes methanol liquid fuel cartridges, including methanol and water solution. Annex A shows the background used to determine the forces expected in normal operation and in foreseeable misuse. Annex B shows the example design for test fixtures for the fuel connector and fuel cartridge type tests.

NOTE Liquid fuel means fuel transported from a cartridge to a MFC power unit in the liquid state, and gas fuel means fuel transported from a cartridge to a power unit in the gaseous state.

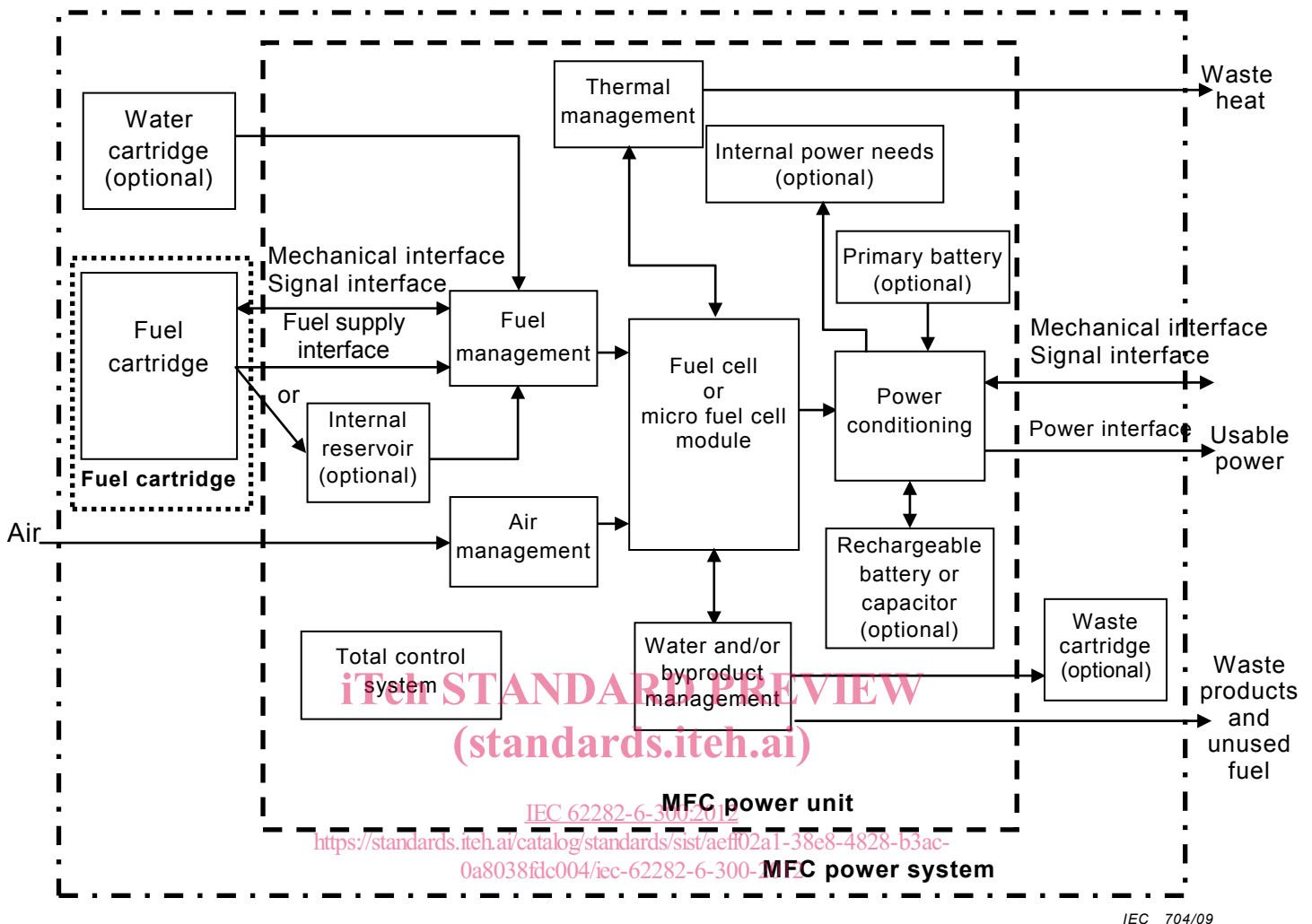


Figure 1 – MFC power system block diagram

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*

IEC 62282-6-100:2010, *Fuel cell technologies – Part 6-100: Micro fuel cell power systems – Safety*

IEC 62282-6-200, *Fuel cell technologies – Part 6-200: Micro fuel cell power systems – Performance test methods*

ISO 1302:2002, *Geometrical product specifications (GPS) – Indication of surface texture in technical product documentation*

3 Terms and definitions

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

3.1

base level

reference plane on the MFC power unit side connector

Note 1 to entry: All dimensions as shown in the connector figures (see 4.3) are relative to this reference plane.

Note 2 to entry: See Figures 3, 6 and 7 in 4.3.2.2 and 4.3.2.3; Figures 13 and 15 in 4.3.3.2 and 4.3.3.3; Figures 22 and 24 in 4.3.4.2 and 4.3.4.3; Figures 29 and 31 in 4.3.5.2 and 4.3.5.3; and Figures 37, 39 and 40 in 4.3.6.2 and 4.3.6.3.

3.2

base plane

surface of the power unit to which the cartridge mates

Note 1 to entry: See Figures 3, 6 and 7 in 4.3.2.2 and 4.3.2.3; Figures 13 and 15 in 4.3.3.2 and 4.3.3.3; Figures 22 and 24 in 4.3.4.2 and 4.3.4.3; Figure 29 and 31 in 4.3.5.2 and 4.3.5.3; and Figures 37, 39 and 40 in 4.3.6.2 and 4.3.6.3.

3.3

connector retainer

mechanical means that secures the connection between the fuel cartridge side connector and the MFC power unit connector

3.4

connector seal position

point where seal is established after the sealing section of the MFC power unit makes contact with the sealing section of the cartridge (seal complete position)

3.5

distance to open valve

distance between the base level of the MFC power unit side connector and the point where the valve starts to open during valve opening sequence

Note 1 to entry: The distance to open the valve is the same as the point where fluid stops flowing during the closing sequence.

Note 2 to entry: See Figure 3 and Table 1 in 4.3.2.2; Figure 13 and Table 6 in 4.3.3.2; Figure 22 and Table 10 in 4.3.4.2; and, Figure 29, Table 14, Figure 37 and Table 19 in 4.3.6.2.

3.6

distance to stop valve

distance between the base level of the MFC power unit side connector and the final position of the end of the valve actuator during the valve opening sequence

Note 1 to entry: The valve actuator is a component responsible for opening of the valve.

Note 2 to entry: See Figure 3 and Table 1 in 4.3.2.2; Figure 13 and Table 6 in 4.3.3.2; Figure 22 and Table 10 in 4.3.4.2; and Figure 29, Table 14, Figure 37 and Table 19 in 4.3.6.2.

3.7

electronic device

any of such electronic devices as cellular phone, music player, digital camera, camcorder, personal digital assistant (PDA), mobile game machine and mobile PC which uses a MFC power unit/system

3.8

force to open valve

force required to push the MFC power unit valve to the stop position (distance to stop valve)

3.9

fractures

visually detectable cracks or breaks in the exterior of the fuel connector, valve and all the casings around the connector

**3.10
fuel**

liquid or gas substance, which is supplied from fuel cartridge to the MFC power unit and is used to produce electricity in a MFC power system

Note 1 to entry: Liquid fuels of methanol and methanol/water solutions are considered fuels in the main body of this standard.

Note 2 to entry: Liquid fuels such as ethanol, ethanol/water solution, formic acid and formic-acid/water solution will be covered as per the supplement to this standard. Gaseous fuel, which have to use different types of fuel connectors, will be covered as per the supplement to this standard.

**3.11
fuel cartridge**

removable article that contains and supplies fuel to the MFC power unit or internal reservoir, not to be refilled by user

Note 1 to entry: See Figure 2 for cartridge types.

**3.11.1
insert cartridge**

fuel cartridge which has its own enclosure and is installed within the enclosure of the electronic device powered by the MFC power system

**3.11.2
exterior cartridge**

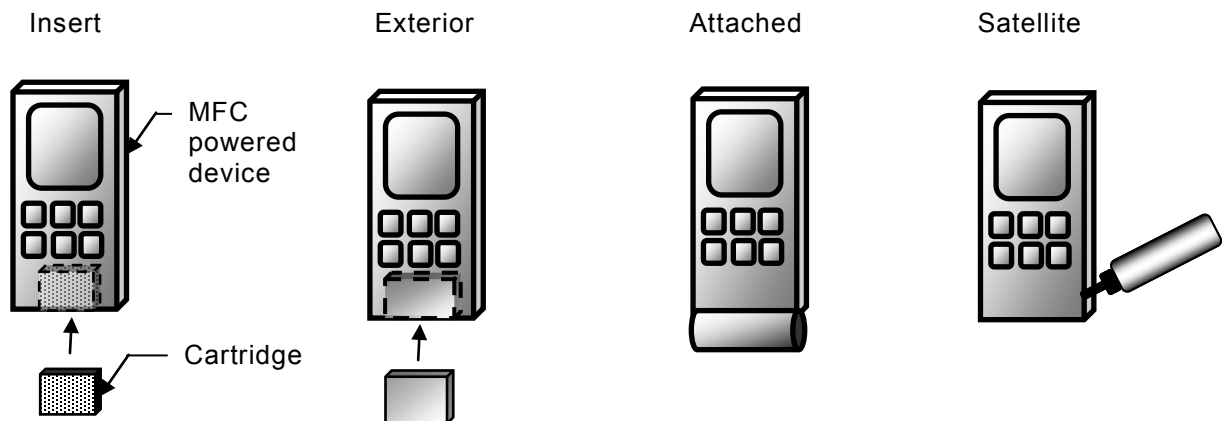
fuel cartridge which has its own enclosure that forms a portion of the enclosure of the electronic device powered by the MFC power system

**3.11.3
attached cartridge**

fuel cartridge, which has its own enclosure that connects to the electronic device powered by the MFC power system

**3.11.4
satellite cartridge**

fuel cartridge that is intended to be connected to and removed from the MFC power unit to transfer fuel to the internal reservoir inside the MFC power unit



IEC 705/09

Figure 2 – Fuel cartridge types

**3.12
pressurized fuel cartridge**

fuel supply unit in which the internal pressure exceeds a gauge pressure of 34,5 kPa measured at 24 °C without external forces

3.13**non-pressurized fuel cartridge**

fuel supply unit in which the internal pressure does not exceed a gauge pressure of 34,5 kPa measured at 24 °C without external forces

3.14**fuel connector**

attachment means between the fuel cartridge and MFC power unit that allows for the passage of fuel from the cartridge to the power unit

3.15**internal reservoir**

structure in a MFC power unit that stores fuel and cannot be removed

3.16**impurity**

materials in any form of metal, inorganic material, organic material, molecule, ion, complex, polymer and oligomer, which are contained in the fuel and may disturb the power generation performance of MFC power unit

3.17**leakage**

accessible hazardous liquid fuel outside the MFC power system or fuel cartridge

3.18**mechanical key**

structure, installed around the fuel connector, that prevents the MFC power unit from being connected to cartridges with improper properties (e.g. fuel type, fuel concentration, internal pressure and connector strength)

[IEC 62282-6-300:2012](https://standards.iteh.ai/catalog/standards/sist/aef02a1-38e8-4828-b3ac-0a8038fd004/iec-62282-6-300-2012)

<https://standards.iteh.ai/catalog/standards/sist/aef02a1-38e8-4828-b3ac-0a8038fd004/iec-62282-6-300-2012>

3.19**MFC power unit**

electric generator as defined in Figure 1, providing direct current output that does not exceed 60 V d.c. and power output that does not exceed 240 VA

Note 1 to entry: The MFC power unit does not include a fuel cartridge.

3.20**MFC power system**

MFC power unit with associated cartridges that is wearable or easily carried by hand

3.21**no fuel vapour loss**

fuel vapour escaping from the fuel cartridge or MFC power system or unit that is less than or equal to 0,08 g/h

4 Fuel connectors**4.1 Basic requirements****4.1.1 Safety**

Fuel connectors shall comply with the safety requirements in IEC 62282-6-100:2010, 4.6 (fuel valves) and 4.12 (fuel supply construction), and shall pass type tests described Clause 7 of that standard.