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BSI Standards Publication

Fuel cell technologies

Part 3-100: Stationary fuel cell power systems — Safety

bsi.

National foreword

This British Standard is the UK implementation of EN IEC 62282-3-100:2020. It is identical to IEC 62282-3-100:2019. It supersedes BS EN 62282-3-100:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/105, Fuel cell technologies.

A list of organizations represented on this committee can be obtained on request to its secretary.

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European foreword

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The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2020-10-10
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2023-04-10

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Endorsement notice

The text of the International Standard IEC 62282-3-100:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60079-20-1	NOTE	Harmonized as EN 60079-20-1
IEC 60812	NOTE	Harmonized as EN IEC 60812
IEC 61025	NOTE	Harmonized as EN 61025

CONTENTS

FOREWORD 6
INTRODUCTION 8
1 Scope 10
2 Normative references 11
3 Terms and definitions 13
4 Safety requirements and protective measures 19
4.1 General safety strategy 19
4.2 Physical environment and operating conditions 20
4.2.1 General 20
4.2.2 Electrical power input 20
4.2.3 Physical environment 20
4.2.4 Fuel input 20
4.2.5 Water input 20
4.2.6 Vibration, shock and bump 20
4.2.7 Handling, transportation, and storage 20
4.2.8 System purging 21
4.3 Selection of materials 21
4.4 General requirements 22
4.5 Pressure equipment and piping 24
4.5.1 Pressure equipment 24
4.5.2 Piping systems 24
4.5.3 Flue gas venting systems 25
4.5.4 Gas-conveying parts 25
4.6 Protection against fire or explosion hazards 26
4.6.1 Prevention against fire and explosion hazards in fuel cell power systems provided with enclosures 26
4.6.2 Prevention of fire and explosion hazards in burners 28
4.6.3 Prevention of fire and explosion hazards in catalytic fuel oxidation systems (catalytic burners) 30
4.7 Electrical safety 31
4.8 Electromagnetic compatibility (EMC) 31
4.9 Control systems and protective components 31
4.9.1 General requirements 31
4.9.2 Control systems 32
4.9.3 Protective components 34
4.10 Pneumatic and hydraulic powered equipment 35
4.11 Valves 35
4.11.1 Shut-off valves 35
4.11.2 Fuel valves 35
4.12 Rotating equipment 36
4.12.1 General requirements 36
4.12.2 Compressors 36
4.12.3 Pumps 37
4.13 Enclosures 37
4.14 Thermal insulating materials 38
4.15 Utilities 38

4.15.1 General requirements 38
4.15.2 Water supply 38
4.15.3 Fuel gas supply 38
4.15.4 Electrical connections 38
4.16 Installation and maintenance 40
4.16.1 Installation 40
4.16.2 Maintenance 40
4.17 Equivalent safety 40
5 Type tests 41
5.1 General requirements 41
5.1.1 General 41
5.1.2 Operating parameters for tests 41
5.2 Test fuels 42
5.3 Basic test arrangements 43
5.4 Leakage tests 43
5.4.1 General 43
5.4.2 Pneumatic leakage tests 43
5.4.3 Hydrostatic leakage tests 47
5.5 Strength tests 47
5.5.1 General 47
5.5.2 Pneumatic strength tests 47
5.5.3 Hydrostatic strength test 49
5.6 Normal operation type test 49
5.7 Electrical overload test 50
5.8 Shutdown parameters 50
5.9 Burner operating characteristics tests 50
5.9.1 General 50
5.9.2 General testing 50
5.9.3 Limit testing 50
5.10 Automatic control of burners and catalytic oxidation reactors 51
5.10.1 General 51
5.10.2 Automatic ignition control burners 51
5.10.3 Automated control of catalytic oxidation reactors 53
5.11 Exhaust gas temperature test 54
5.12 Surface and component temperatures 54
5.13 Wind tests 55
5.13.1 General 55
5.13.2 Wind source calibration procedure for winds directed perpendicular to the wall 55
5.13.3 Verification of operation of outdoor fuel cell power systems under wind conditions 56
5.13.4 Verification of operation of indoor fuel cell power systems vented horizontally through an outside wall 57
5.13.5 Carbon monoxide (CO) and flammable gas components emissions under wind – Indoor units 59
5.13.6 Carbon monoxide (CO) and flammable gas components emissions under wind – Outdoor units 59
5.14 Rain test 60
5.14.1 Outdoor units 60
5.14.2 Indoor units supplied with horizontal venting hardware 60

5.14.3 Test method 60
5.15 Emissions 60
5.15.1 General 60
5.15.2 Carbon monoxide (CO) and flammable gas emissions 60
5.15.3 Normal conditions 61
5.16 Blocked condensate line test 61
5.17 Condensate discharge test 61
5.18 Electrical safety tests 62
5.19 EMC test 62
5.20 Venting system leakage test 62
5.21 Leakage tests (repeat) 63
6 Routine tests 63
6.1 General requirements 63
6.2 Leakage test 63
6.3 Dielectric strength test 64
6.4 Burner operation test 64
7 Marking, labelling and packaging 64
7.1 General requirements 64
7.2 Fuel cell power system marking 64
7.3 Marking of components 65
7.4 Technical documentation 65
7.4.1 General 65
7.4.2 Installation manual 66
7.4.3 User's information manual 66
7.4.4 Operating manual 69
7.4.5 Maintenance manual 70
Annex A (informative) Significant hazards, hazardous situations and events dealt with in this document 71
Annex B (informative) Carburization and material compatibility for hydrogen service 73
B.1 Carburization 73
B.2 Material compatibility for hydrogen service 73
B.2.1 General 73
B.2.2 Metals and metallic materials 73
B.2.3 Polymers, elastomers, and other non-metallic materials 75
B.2.4 Reference documents 75
Annex C (normative) Normative replacement subclauses for small fuel cell power systems with rated electrical output less than 10 kW, and maximum pressure of less than 0,1 MPa (gauge) for fuel and oxidant passages 79
Bibliography 81

Figure 1 – Typical stationary fuel cell power system 8
Figure 2 – Minimum test pressures 49
Figure 3 – Test wall with static pressure ports and vent terminal locations 56
Figure 4 – Vent test wall 57
Figure 5 – Piezo ring and details of typical construction 58
Figure 6 – Safety precautions for odorized gas-fuelled systems 67
Figure 7 – Safety precautions for odorant-free gas fuelled systems 68
Figure 8 – Safety precautions for liquid fuelled systems 68

Table 1 – Allowable surface temperature rises 23
Table 2 – Leakage test requirements 46
Table 3 – Ultimate strength test requirements 48
Table 4 – Wind calibration 56
Table A.1 – Hazardous situations and events 71

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FUEL CELL TECHNOLOGIES –

Part 3-100: Stationary fuel cell power systems – Safety

FOREWORD

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International Standard IEC 62282-3-100 has been prepared by IEC technical committee 105: Fuel cell technologies.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) recognition that fuel carrying components qualified to leakage standards (soundness) need not be considered as potential flammable leak sources;
b) new Annex C for small power systems; and
c) clarifications for numerous requirements and tests.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
105/695/FDIS	105/705/RVD

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

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

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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

A typical stationary fuel cell power system is shown in Figure 1.

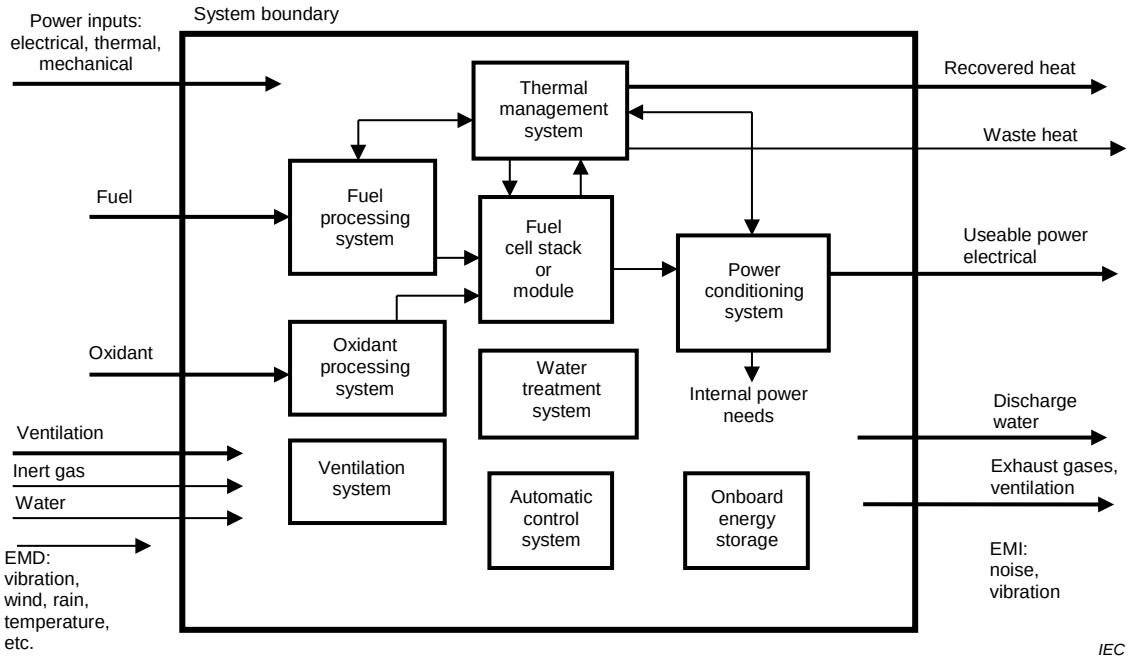

Figure 1 – Typical stationary fuel cell power system

The overall design of the power system anticipated by this document forms an assembly of integrated systems, as necessary, intended to perform designated functions, as follows.

- Fuel processing system – System of chemical and/or physical processing equipment plus associated heat exchangers and controls required to prepare, and if necessary, pressurize, the fuel for utilization within a fuel cell power system.
- Oxidant processing system – System that meters, conditions, processes and may pressurize the incoming supply for use within the fuel cell power system.
- Thermal management system – System that provides heating or cooling and heat rejection to maintain the fuel cell power system in the operating temperature range, and may provide for the recovery of excess heat and assist in heating the power train during start-up.
- Water treatment system – System that provides all the necessary purification treatment of the recovered or added water for use within the fuel cell power system.
- Power conditioning system – Equipment that is used to adapt the electrical energy produced by the fuel cell stack(s) to application requirements as specified by the manufacturer.
- Automatic control system – System(s) that is composed of sensors, actuators, valves, switches and logic components that maintain the fuel cell power system parameters within the manufacturer's specified limits including moving to safe states without manual intervention.
- Ventilation system – System that provides air through mechanical or natural means to the fuel cell power system's enclosure.
- Fuel cell modules – Equipment assembly of one or more fuel cell stacks which electrochemically converts chemical energy to electric energy and thermal energy intended to be integrated into a power generation system.

- Fuel cell stack – Equipment assembly of cells, separators, cooling plates, manifolds and a support structure that electrochemically converts, typically, hydrogen rich gas and air reactants to DC power, heat and other reactant bi-products.
- Onboard energy storage – System of internal electric energy storage devices intended to aid or complement the fuel cell module in providing power to internal or external loads.

FUEL CELL TECHNOLOGIES –

Part 3-100: Stationary fuel cell power systems – Safety

1 Scope

This part of IEC 62282 applies to stationary packaged, self-contained fuel cell power systems or fuel cell power systems comprised of factory matched packages of integrated systems which generate electricity through electrochemical reactions.

This document applies to systems

a) intended for electrical connection to mains direct, or with a transfer switch, or to a stand-alone power distribution system;
b) intended to provide AC or DC power;
c) with or without the ability to recover useful heat;
d) intended for operation on the following input fuels:
    1) natural gas and other methane rich gases derived from renewable (biomass) or fossil fuel sources, for example, landfill gas, digester gas, coal mine gas;
    2) fuels derived from oil refining, for example, diesel, gasoline, kerosene, liquefied petroleum gases such as propane and butane;
    3) alcohols, esters, ethers, aldehydes, ketones, Fischer-Tropsch liquids and other suitable hydrogen-rich organic compounds derived from renewable (biomass) or fossil fuel sources, for example, methanol, ethanol, di-methyl ether, biodiesel;
    4) hydrogen, gaseous mixtures containing hydrogen gas, for example, synthesis gas, town gas.

This document does not cover:

- micro fuel cell power systems;
- portable fuel cell power systems;
- propulsion fuel cell power systems.

NOTE For special applications such as “marine auxiliary power”, additional requirements can be given by the relevant marine ship register standard.

This document is applicable to stationary fuel cell power systems intended for indoor and outdoor commercial, industrial and residential use in non-hazardous areas.

This document contemplates all significant hazards, hazardous situations and events, with the exception of those associated with environmental compatibility (installation conditions), relevant to fuel cell power systems, when they are used as intended and under the conditions foreseen by the manufacturer.

This document deals with conditions that can yield hazards on the one hand to persons, and on the other to damage outside the fuel cell power system only. Protection against damage to the fuel cell power system internals is not addressed in this document, provided it does not lead to hazards outside the fuel cell power system.