

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Fuel cell technologies –

Part 3-400: Stationary fuel cell power systems – Small stationary fuel cell power system with combined heat and power output

Technologies des piles à combustible –

Partie 3-400: Systèmes à piles à combustible stationnaires – Petits systèmes à piles à combustible stationnaires avec chaleur et puissance en sortie combinées



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FUEL CELL TECHNOLOGIES –

**Part 3-400: Stationary fuel cell power systems –
Small stationary fuel cell power system
with combined heat and power output**

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International Standard IEC 62282-3-400 has been prepared by IEC technical committee 105: Fuel cell technologies.

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

FDIS	Report on voting
105/620/FDIS	105/624/RVD

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

The reader's attention is drawn to the fact that Annex B, Annex C and Annex D list all of the “in-some-countries” clauses on differing practices of a less permanent nature relating to the subject of this standard.

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FUEL CELL TECHNOLOGIES –

Part 3-400: Stationary fuel cell power systems – Small stationary fuel cell power system with combined heat and power output

1 Scope

This part of IEC 62282 applies to small stationary fuel cell power systems serving as a heating appliance providing both electric power and useful heat with or without a supplementary heat generator providing peak load function.

This standard applies to fuel cell power systems that are intended to be permanently connected to the electrical system of the customer (end user). Direct connection to the mains (parallel operation) is also within the scope of this standard.

NOTE 1 Parallel operation is subject to the permission of the local electric power supply utility.

This standard is limited to gas and liquid fuelled fuel cell CHP appliances that have a heat input based on lower heating value of less than or equal to 70 kW. For some regional applications, the output electric power is limited. Specific limitations are given in Clause C.1 for Japan.

This standard applies to systems as shown in Figure 1.

One is a system where both stationary fuel cell power system and supplementary heat generator are installed in one enclosure without any partition.

This standard does not have to apply to the supplementary heat generator of systems where the stationary fuel cell power system and the supplementary heat generator are not built in one enclosure, and whose ducts are not common (that is, each appliance has its own dedicated duct system).

This standard applies to systems intended for operation on the following supplied input fuels:

- natural gas and other methane rich gases;
- fuels derived from oil refining (liquefied petroleum gases, propane, and butane);
- hydrogen as supply gas for the CHP generator.

NOTE 2 It is possible that other fuels such as alcohols (methanol, ethanol), kerosene, or hydrogen for the supplementary heat generator will be added in future amendments or revisions.

This part of IEC 62282 applies to systems where:

- the heat transfer fluid (heat output) is water or a mixture of water and additives to prevent corrosion and to prevent freezing;
- the heat transfer fluid circuit (heat output) can be designed for open or sealed operation;
- the maximum temperature of the heat transfer fluid (heat output) does not exceed 100 °C, or the value given in Clause B.1 for Europe or in Clause D.1 for the USA;
- the maximum pressure of the heat transfer fluid (heat output) circuit does not exceed 0,3 MPa, or the limits given in Clause B.1 for Europe, or C.4.3 for Japan or Clause D.1 for the USA;
- the maximum pressure of the domestic hot water circuit, if installed, does not exceed 0,1 MPa, or the limits as given in Clause D.1 for the USA.

This standard applies to systems with either condensing or non-condensing conditions in the exhaust gas.

This standard applies to appliances

- with ducts included as part of the appliance (Type B, Type C) and
- without ducts (Type A)

Duct systems are shown in Annex F. The chimney in the figures is part of the building and is not within the scope of this standard.

Different combustion air/flue duct circuit configurations are accommodated, see Annex F.

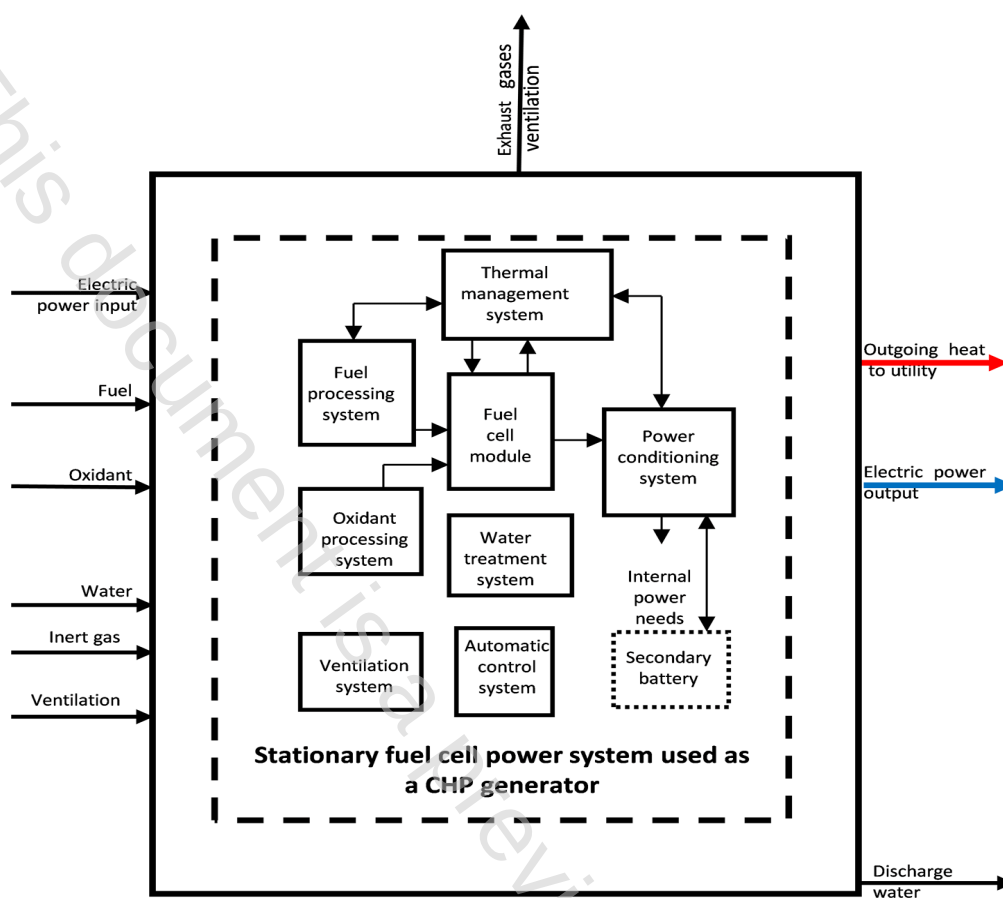
This standard applies to both indoor and outdoor installations.

This standard applies to type testing only.

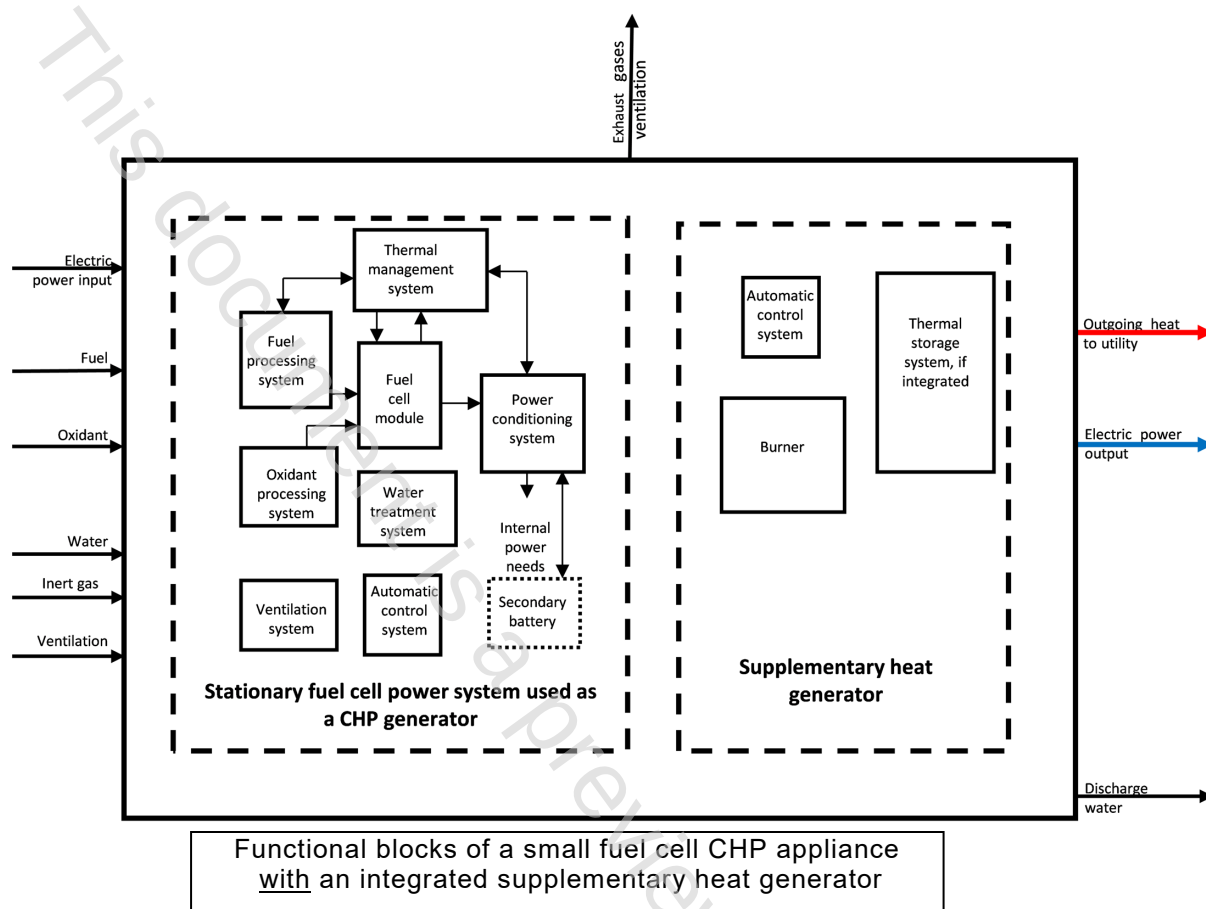
This standard specifies the requirements for construction, safety, installation, fitness for purpose, rational use of energy, marking, and performance measurement of these appliances.

This standard also provides regional and country specific requirements to facilitate the worldwide application of this IEC standard. These essential regional and country specific requirements are given in Annex B for Europe, in Annex C for Japan and in Annex D for the USA.

If the user or manufacturer chooses a regional specific annex to apply this standard, then that annex applies to the appliance in its entirety without mixing requirements between annexes. The chosen regional or country specific annex becomes normative.



Functional blocks of a small fuel cell CHP appliance without an integrated supplementary heat generator



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Figure 1 – Configuration with and without integrated supplementary heat generator

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.

NOTE Regional specific standards are given in Clause B.2 for Europe, in Clause C.2 for Japan and in Clause D.2 for the USA.

IEC 60079 (all parts), *Explosive atmospheres*

IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

IEC 60079-2, *Explosive atmospheres – Part 2: Equipment protection by pressurized enclosure "p"*

IEC 60079-10-1, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

IEC 60079-20-1, *Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification – Test methods and data*

IEC 60079-30-1, *Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements*

IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60335-2-102:2004, *Household and similar electrical appliances – Safety – Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections*

IEC 60335-2-102:2004/AMD1:2008

IEC 60335-2-102:2004/AMD2:2012

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60721-3-1, *Classification of environmental conditions – Part 3 Classification of groups of environmental parameters and their severities – Section 1: Storage*

IEC 60721-3-2, *Classification of environmental conditions – Part 3 Classification of groups of environmental parameters and their severities – Section 2: Transportation*

IEC 60721-3-3, *Classification of environmental conditions – Part 3-3: Classification of groups of environmental parameters and their severities – Stationary use at weatherprotected locations*

IEC 60730-1, *Automatic electrical controls – Part 1: General requirements*

IEC 60730-2-5, *Automatic electrical controls – Part 2-5: Particular requirements for automatic electrical burner control systems*

IEC 60730-2-9, *Automatic electrical controls – Part 2-9: Particular requirements for temperature sensing control*

IEC 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic currents emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC TS 61000-3-4, *Electromagnetic compatibility (EMC) – Part 3-4: Limits – Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A*

IEC 61000-3-11, *Electromagnetic Compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*

IEC TS 62282-1:2013, *Fuel cell technologies – Part 1: Terminology*

IEC 62282-2:2012, *Fuel cell technologies – Part 2: Fuel cell modules*

IEC 62282-3-201:2013, *Fuel cell technologies – Part 3-201: Stationary fuel cell power systems – Performance test methods for small fuel cell power systems*

CISPR 14-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 14-2, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 2: Immunity – Product family standard;*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 262, *ISO general purpose metric screw threads – Selected sizes for screws, bolts and nuts*

ISO 3166-1 *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*

ISO 4126-1, *Safety devices for protection against excessive pressure – Part 1: Safety valves*

ISO 23550:2011, *Safety and control devices for gas burners and gas-burning appliances – General requirements*

ISO 23551-1, *Safety and control devices for gas burners and gas burning appliances – Particular requirements – Part 1: Automatic and semi-automatic valves*

ISO 23551-2, *Safety and control devices for gas burners and gas-burning appliances – Particular requirements – Part 2: Pressure regulators*

ISO 23551-3, *Safety and control devices for gas burners and gas-burning appliances – Particular requirements – Part 3: Gas/air ratio controls, pneumatic type*

ISO 23552-1, *Safety and control devices for gas and/or oil burners and gas and/or oil appliances – Particular requirements – Part 1: Fuel/air ratio controls, electronic type*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>