SVENSK STANDARD SS-EN IEC 62282-3-100

Fastställd	Utgåva	Sida	Ansvarig kommitté
2020-06-10	2	1 (1+86)	SEK TK 105

Bränsleceller – Del 3-100: Stationära system – Säkerhet

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

Som svensk standard gäller europastandarden EN IEC 62282-3-100:2020. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62282-3-100:2020.

Nationellt förord

Europastandarden EN IEC 62282-3-100:2020

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 62282-3-100, Second edition, 2019 - Fuel cell technologies - Part 3-100: Stationary fuel cell power systems - Safety**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 62282-3-100, utgåva 1, 2012, gäller ej fr o m 2023-04-10.

ICS 27.070.00

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SEK Svensk Elstandard
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62282-3-100

April 2020

ICS 27.070

Supersedes EN 62282-3-100:2012 and all of its amendments and corrigenda (if any)

English Version

Fuel cell technologies - Part 3-100: Stationary fuel cell power systems - Safety (IEC 62282-3-100:2019)

Technologies des piles à combustible - Partie 3-100: Systèmes à piles à combustible stationnaires - Sécurité (IEC 62282-3-100:2019)

Brennstoffzellentechnologien - Teil 3-100: Stationäre Brennstoffzellen-Energiesysteme - Sicherheit (IEC 62282-3-100:2019)

This European Standard was approved by CENELEC on 2019-03-19. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 62282-3-100:2020 E

European foreword

The text of document 105/695/FDIS, future edition 2 of IEC 62282-3-100, prepared by IEC/TC 105 "Fuel cell technologies" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62282-3-100:2020.

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

This document supersedes EN 62282-3-100:2012 and all of its amendments and corrigenda (if any).

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

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

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60079-2	-	Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"	EN 60079-2	-
IEC 60079-10-1	-	Explosive atmospheres -- Part 10-1: Classification of areas - Explosive gas atmospheres	EN 60079-10-1	-
IEC 60079-29-1 (mod)	-	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases	EN 60079-29-1	-
IEC 60204-1 (mod)	-	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	EN 60204-1	-
IEC 60335-1 (mod)	2010	Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1	2012
			+A11	2014
			+A12	2017
			+AC	2014
			+A14	2019
			+A13	2017
			+prA15	
			+prA17	
			+prA16	
IEC 60335-2-51	-		-	-
IEC 60529	-	Classification of degrees of protection provided by enclosures	HD 365 S3	-
IEC 60730-1 (mod)	-	Automatic electrical controls - Part 1: General requirements	EN 60730-1	-
			+prA	
IEC 60730-2-5 (mod)	-	Automatic electrical controls - Part 2-5: Particular requirements for automatic electrical burner control systems	EN 60730-2-5	-
IEC 60730-2-6	-	Automatic electrical controls - Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements	EN 60730-2-6	-
IEC 60730-2-9	-	Automatic electrical controls - Part 2-9: Particular requirements for temperature sensing control	EN IEC 60730-2-9	-

Publication	Year	Title	EN/HD	Year
IEC 60950-1 (mod)	-	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1	-
			+A12	2011
			+AC	2011
			+prA13	
			+A11	2009
			+AC	
IEC 61000-3-2	-		EN IEC 61000-3-2	-
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	EN 61000-3-3	-
IEC 61000-3-11	-		EN IEC 61000-3-11	-
IEC 61000-6-1	-	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments	EN IEC 61000-6-1	-
			+prA	
IEC 61000-6-2	-	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	EN IEC 61000-6-2	-
			+prA	
IEC 61000-6-2	-	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	EN IEC 61000-6-2	-
			+prA	
IEC 61000-6-4	-		EN IEC 61000-6-4	-
IEC 61508	series	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements (see Functional Safety and IEC 61508)	EN 61508	series
IEC 61511-1	-	Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements	EN 61511-1	-
IEC 62040-1-1	-		EN 62040-1-1	-
			+EN 62040-1-1:2003/corrigendum Aug. 2004	2004
IEC 62061	-	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	EN 62061	-
			+EN 62061:2005/corrigendum Feb. 2010	2010
IEC 62368-1	-	Audio/video, information and communication technology equipment - Part 1: Safety requirements	EN IEC 62368-1	-
			+prAB	
ISO 3864-2	-	Graphical symbols_- Safety colours and safety signs_- Part_2: Design principles for product safety labels	-	-

Publication	Year	Title	EN/HD	Year
ISO 4413	-	Hydraulic fluid power_- General rules and safety requirements for systems and their components	EN ISO 4413	-
ISO 4414	-	Pneumatic fluid power_- General rules and safety requirements for systems and their components	EN ISO 4414	-
ISO 5388	-	Stationary air compressors - Safety rules and code of practice		-
ISO 10439	series		EN ISO 10439	series
ISO 10440-1	-		EN ISO 10440-1	-
ISO 10440-2	-	Petroleum and natural gas industries - Rotary-type positive-displacement compressors -- Part 2: Packaged air compressors (oil-free)	EN ISO 10440-2	-
ISO 10442	-	Petroleum, chemical and gas service industries - Packaged, integrally geared centrifugal air compressors	EN ISO 10442	-
ISO 12499	-	Industrial fans -- Mechanical safety of fans -- Guarding	EN ISO 12499	-
ISO 13631	-	Petroleum and natural gas industries - Packaged reciprocating gas compressors	EN ISO 13631	-
ISO 13707	-	Petroleum and natural gas industries_-- Reciprocating compressors		-
ISO 13709	-	Centrifugal pumps for petroleum, petrochemical and natural gas industries	EN ISO 13709	-
ISO 13849-1	-	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1	-
ISO 13850	-	Safety of machinery - Emergency stop function - Principles for design	EN ISO 13850	-
ISO 14847	-	Rotary positive displacement pumps - Technical requirements	EN ISO 14847	-
ISO 15649	-	Petroleum and natural gas industries_-- Piping		-
ISO 16111	-	Transportable gas storage devices --- Hydrogen absorbed in reversible metal hydride		-
ISO 23550	-	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 valves		-
ISO 23553-1	-		EN ISO 23553-1	-
ISO 26142	-	Hydrogen detection apparatus -- Stationary applications		-
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/TS 61000-3-5	-	Electromagnetic compatibility (EMC) - Part 3-5: Limits - Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 75 A		-

Publication	Year	Title	EN/HD	Year
IEC/IEEE 60079-30-1 (mod)	--	Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements	EN 60079-30-1	-

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FUEL CELL TECHNOLOGIES –

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

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.
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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.

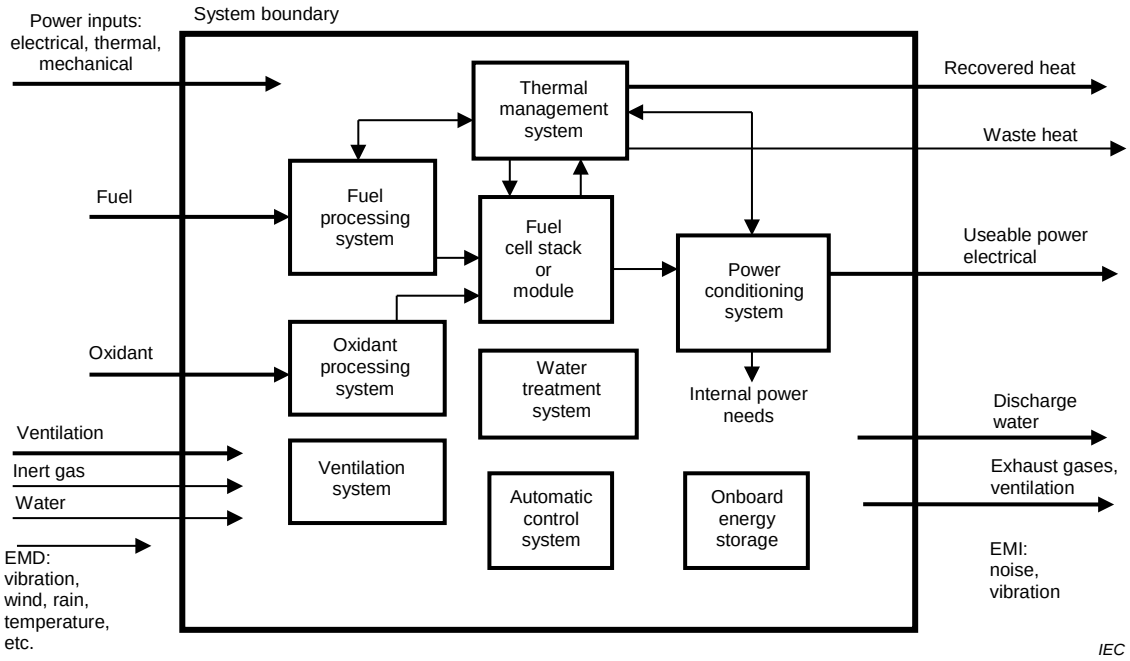

Figure 1 – Typical stationary fuel cell power system

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.

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.

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 60079-29-1, *Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases*

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

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60335-1:2016, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60335-2-51, *Household and similar electrical appliances – Safety – Part 2-51: Particular requirements for stationary circulation pumps for heating and service water installations*

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

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 60730-2-6, *Automatic electrical controls – Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements*

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

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

IEC 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current 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 TS 61000-3-5, *Electromagnetic compatibility (EMC) – Part 3-5: Limits – Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 75 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 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity standard for residential, commercial and light-industrial environments*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

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

IEC 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems*

IEC 61511-1, *Functional safety – Safety instrumented systems for the process industry sector – Part 1: Framework, definitions, system, hardware and application programming requirements*

IEC 62040-1, *Uninterruptible power systems (UPS) – Part 1: Safety requirements*

IEC 62061, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*

IEC 62368-1, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

ISO 3864-2, *Graphical symbols – Safety colours and safety signs – Part 2: Design principles for product safety labels*

ISO 4413, *Hydraulic fluid power – General rules and safety requirements for systems and their components*

ISO 4414, *Pneumatic fluid power – General rules and safety requirements for systems and their components*

ISO 5388, *Stationary air compressors – Safety rules and code of practice*

ISO 10439 (all parts), *Petroleum, petrochemical and natural gas industries – Axial and centrifugal compressors and expander-compressors*

ISO 10440-1, *Petroleum, petrochemical and natural gas industries – Rotary-type positive-displacement compressors – Part 1: Process compressors*

ISO 10440-2, *Petroleum and natural gas industries – Rotary-type positive-displacement compressors – Part 2: Packaged air compressors (oil-free)*

ISO 10442, *Petroleum, chemical and gas service industries – Packaged, integrally geared centrifugal air compressors*

ISO 12499, *Industrial fans – Mechanical safety of fans – Guarding*

ISO 13631, *Petroleum and natural gas industries – Packaged reciprocating gas compressors*

ISO 13707, *Petroleum and natural gas industries – Reciprocating compressors*

ISO 13709, *Centrifugal pumps for petroleum, petrochemical and natural gas industries*

ISO 13849-1, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

ISO 13850, *Safety of machinery – Emergency stop function – Principles for design*

ISO 14847, *Rotary positive displacement pumps – Technical requirements*

ISO 15649, *Petroleum and natural gas industries – Piping*

ISO 16111, *Transportable gas storage devices – Hydrogen absorbed in reversible metal hydride*

ISO 23550, *Safety and control devices for gas and/or oil burners and 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 23553-1, *Safety and control devices for oil burners and oil-burning appliances – Particular requirements – Part 1: Automatic and semi-automatic valves*

ISO 26142, *Hydrogen detection apparatus – Stationary applications*