



ISO/TC 197 **N 530**

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Update on the activities of IEC/TC 105 *Fuel cell technologies*

information to **P**-members, **O**-members and liaisons

to be discussed at the ISO/TC 197 plenary meeting under item 12.1 of the draft agenda (**N 523**)

Dear members,

Please find attached the liaison report from IEC/TC 105 that was kindly forwarded by Mr. Gerhard Imgrund, Assistant Secretary of IEC/TC 105, in preparation for our upcoming ISO/TC 197 plenary meeting.

Yours sincerely,

Sylvie Gingras, Secretary of ISO/TC197
Bureau de normalisation du Québec
on behalf of the Standards Council of Canada

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Liaison report of IEC TC 105 Fuel cell technologies

Technical Officers

Role	Name	NC
Secretary	Mr Wolfgang Winkler	DE
Chairman	Mr Fumio Ueno	JP
Technical Officer	Mr Charles Jacquemart	XC
Assistant Secretary	Mr Gerhard Imgrund	DE

Liaisons

Type Liaison	Committee	Description
Internal IEC Liaison	TC 31	Equipment for explosive atmospheres
Internal IEC Liaison	TC 8	Systems aspects for electrical energy supply
Liaison ISO	ISO/TC 22	Road vehicles
Liaison ISO	ISO/TC 21	Equipment for fire protection and fire fighting
Liaison ISO	ISO/TC 197	Hydrogen technologies
Liaison A	EC	European Commission

P- and O-memberships

Country	P/O Status	IEC Membership
Austria	O-Member	Full Member
Australia	O-Member	Full Member
Belgium	O-Member	Full Member
Brazil	O-Member	Full Member
Canada	P-Member	Full Member
Switzerland	O-Member	Full Member
China	P-Member	Full Member
Czech Republic	P-Member	Full Member
Germany	P-Member	Full Member
Denmark	P-Member	Full Member
Egypt	P-Member	Full Member
Spain	P-Member	Full Member
Finland	P-Member	Full Member
France	P-Member	Full Member
United Kingdom	P-Member	Full Member
Israel	P-Member	Full Member
Iran	O-Member	Full Member
Italy	P-Member	Full Member
Japan	P-Member	Full Member
Korea, Republic of	P-Member	Full Member
Netherlands	P-Member	Full Member
Norway	O-Member	Full Member
Poland	O-Member	Full Member
Portugal	O-Member	Full Member
Romania	O-Member	Full Member
Serbia	O-Member	Full Member
Sweden	O-Member	Full Member
Thailand	O-Member	Full Member
Turkey	O-Member	Full Member
United States of America	P-Member	Full Member

TC105 Work Programme

Project Reference	Title	Stage	Document Reference	Forecast Publication Date
IEC 62282-2 Ed. 2.0	Fuel cell technologies - Part 2: Fuel cell modules	RDIS	105/306/CDV	2012-05
IEC 62282-3-100 Ed. 1.0	Fuel cell technologies - Part 3-100: Stationary fuel cell power systems - Safety	CDIS	105/371/FDIS	2012-02
IEC 62282-3-150 Ed. 1.0	Fuel cell technologies - Part 3-150: Stationary fuel cell power systems - Small stationary fuel cell power system serving as a heating appliance	ANW	105/318/NP	2014-06
IEC 62282-3-201 Ed. 1.0	Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small polymer electrolyte fuel cell power systems	ACDV	105/332/CD	2013-05
IEC 62282-3-300 Ed. 1.0	Fuel cell technologies - Part 3-300: Stationary fuel cell power systems - Installation	CDIS	105/377/FDIS	2012-03
IEC 62282-4-100 Ed. 1.0	Fuel Cell Technologies - Part 4-100: Fuel cell systems for forklift applications - Safety requirements, environmental aspects and test procedures	ANW	105/310/NP	2014-05
IEC 62282-4-200 Ed. 1.0	Fuel Cell Technologies - Part 4-200: Fuel cell systems for forklift applications - Performance requirements and test procedures	ANW	105/310/NP	2014-05
IEC 62282-5-1 Ed. 2.0	Fuel cell technologies - Part 5-1: Portable fuel cell power systems - Safety	ADIS	105/299/CDV	2012-01
IEC 62282-6-100 am1 Ed. 1.0	Amendment 1 to IEC 62282-6-100 Ed.1: Fuel cell technologies - Part 6-100: Micro fuel cell power systems - Safety	CCDV	105/348/CDV	2013-01
IEC 62282-6-110 Ed. 1.0	Fuel cell technologies - Part 6-110: Aluminium micro fuel cell power systems - Safety	ANW	105/304/NP	2013-08
IEC 62282-6-200 Ed. 2.0	Fuel cell technologies - Part 6-200: Micro fuel cell power systems - Performance test methods	ADIS	105/327/CDV	2012-12
IEC 62282-6-300 Ed. 2.0	Fuel cell technologies - Part 6-300: Micro fuel cell power systems - Fuel cartridge interchangeability	CCDV	105/370/CDV	2013-02

IEC 62282-6-310 Ed. 1.0	Fuel cell technologies - Part 6-310: Micro fuel cell power systems - Power and data interchangeability	ANW	105/264/NP	2014-03
IEC/TS 62282-7-2 Ed. 1.0	Fuel cell technologies - Part 7-2: Single cell/stack performance test methods for solid oxide fuel cells (SOFC)	1CD	105/362/CD	2013-03

Publications

Reference	Edition	Date	Title
IEC/TS 62282-1	Edition 2.0	2010-04-29	Fuel cell technologies - Part 1: Terminology
IEC 62282-2	Edition 1.1	2007-03-29	Fuel cell technologies - Part 2: Fuel cell modules
IEC 62282-2	Edition 1.0	2004-07-29	Fuel cell technologies - Part 2: Fuel cell modules
IEC 62282-2-am1	Edition 1.0	2007-02-20	Amendment 1 - Fuel cell technologies - Part 2: Fuel cell modules
IEC 62282-3-1	Edition 1.0	2007-04-24	Fuel cell technologies - Part 3-1: Stationary fuel cell power systems - Safety
IEC 62282-3-3	Edition 1.0	2007-11-14	Fuel cell technologies - Part 3-3: Stationary fuel cell power systems - Installation
IEC 62282-3-200	Edition 1.0	2011-10-19	Fuel cell technologies - Part 3-200: Stationary fuel cell power systems - Performance test methods
IEC 62282-5-1	Edition 1.0	2007-02-23	Fuel cell technologies - Part 5-1: Portable fuel cell power systems - Safety
IEC 62282-6-100	Edition 1.0	2010-03-03	Fuel cell technologies - Part 6-100: Micro fuel cell power systems - Safety
IEC/PAS 62282-6-150	Edition 1.0	2011-04-21	Fuel cell technologies - Part 6-150: Micro fuel cell power systems - Safety - Water reactive (UN Division 4.3) compounds in indirect PEM fuel cells
IEC 62282-6-200	Edition 1.0	2007-11-14	Fuel cell technologies - Part 6-200: Micro fuel cell power systems - Performance test methods
IEC 62282-6-300	Edition 1.0	2009-06-05	Fuel cell technologies - Part 6-300: Micro fuel cell power systems - Fuel cartridge interchangeability
IEC/TS 62282-7-1	Edition 1.0	2010-06-10	Fuel cell technologies - Part 7-1: Single cell test methods for polymer electrolyte fuel cell (PEFC)



Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting, or sent to the Central Office promptly after its contents have been agreed by the committee.

Title of TC
Fuel cell technologies

A Background

IEC TC 105 held its first plenary meeting in Frankfurt/Main in 2000 with the aim of developing safety and performance related standards for fuel cell appliances.

The scope of IEC TC 105 has regularly been reconsidered and amended to reflect the demands of the business and technological environment in which TC 105 operates to ensure that it continues to meet the demands of the industry sectors it serves.

The present activities comprise six main elements:

- to prepare International Standards for stationary fuel cell systems, especially for distributed small power generators,
- to prepare International Standards for FC components and FC modules
- to prepare International Standards for portable and transportable fuel cell systems,
- to prepare International Standards for fuel cell systems for auxiliary power units and for propulsion other than road vehicles, including ships and aircrafts
- to prepare International Standards for fuel cell systems and their integration into local infrastructures, devices and hybrid systems, especially with batteries and on the longer term with heat engines.
- to follow up new developments of fuel cell and related technologies for an early detection of standardization needs as for batteries, especially for flow batteries

B Business Environment

B.1 General

Fuel cells are mainly being developed for their use in stationary, transportation and portable power units. IEC/TC 105 has published standards for these applications. Fuel cell technologies are in the transition from R & D to a commercial stage. Commercialization in stationary applications, transportation applications or as portable power applications has already taken place.

It is therefore important to elaborate International standards at this early stage in order to facilitate commercialization, international trade and harmonize and ease approval procedures for fuel cell units. On the other hand, there is a strong need for not restricting further development of the relatively young technology.

International standards should contribute to avoid the elaboration of purely national or regional standards, which could lead to conflicting national approval procedures. Moreover, TC 105 takes care that the fuel cell standards are duly developed taking the system approach into account to assure that all borderlines and interfaces of internationally standardized fuel cell products are compatible with other internationally standardized products/systems used in conjunction with these fuel cell systems.

The fuel cell business aims for one internationally valid set of standards. Existing national (partly drafted) standards should be harmonized in order to avoid deviations for certain market regions.

IEC standards established by IEC/TC 105 should coordinate and correlate to the requirements for all fuel cell applications. Where appropriate standards from related technologies for the respective application are existent, references should be incorporated into International standards prepared by IEC/TC 105.

Worldwide market (sales for 2020)

Vague estimations expect that for fuel cells the worldwide market is approximately 10 billion US Dollar.

Geographic segmentation could be: 35 % North America, 25 % Asia/Pacific and 30 % Europe (EU), 10 % other regions.

B.2 Market demand

TC 105 standards are intended to cover the market demand of fuel cell manufacturers, system integrators, installers and users. Moreover, they have to take into account the specific interests of authorities, approval organizations, component manufacturers, and fuel suppliers and the interests related to the infrastructure surrounding fuel cell systems.

B.3 Trends in technology

Fuel cell technologies are relatively new and fast developing technologies which are being commercialized. New technologies, components and materials are appearing and quickly developing on a global basis. Upcoming all-electric systems for power trains of transportation systems (ground vehicles, ships and aircrafts) can use fuel cell technologies ideally as their main power source. Fuel cell systems can extend the operating period of batteries and super caps. Fuel cells can also support renewable technologies such as wind turbines and photovoltaic by providing power and energy when the wind does not blow or when the sun does not shine.

B.4 Market trends

Fuel cell appliances can contribute to reduce the impact on the environment and climate (see B.5). The consequence of these market trends will be that TC 105 fosters its activities to increase worldwide applicability of its standards encouraging National Committees to actively contribute to the IEC TC 105 standardization work and to implement these International Standards identically at national and regional levels.

B.5 Ecological environment

The commercialization of fuel cell technologies is driven by a growing demand for enhancing the energy efficiency, lowering emissions and noise as well as by increasing energy supply alternatives. Fuel cell technologies can provide high efficiencies, produce low emissions, offer good possibility for co-generation and can work on a variety of fuels.

In accordance with the IEC Guide 109, TC 105 shall give careful consideration to the environmental impact by specified requirements and test methods. Furthermore, standards developed by IEC/TC 105 should recognize the appropriate use of recycled material and re-use of components, subsystems and systems consistent with continuous fuel cell safety and performance.

B.6 Sustainable Development

The standardization work of ICE TC 105 should contribute to improve the living conditions of human beings worldwide equally by supplying a more sustainable energy supply and by creating new jobs. Worldwide dissemination of knowledge and skills by high quality standards will be the tool.

C System approach aspects

TC 105 is in terms of the IEC system approach customer committee of the following IEC (and ISO) technical committees, i.e. TC 105 standards refer to the standards developed by these TCs.

Technical committees (TC 105 acts as a customer)	TC 1	Terminology
	TC 2	Rotating machinery
	TC 3	Information structures, documentation and graphical symbols
	TC 13	Electricity metering equipment (AC)
	TC 17	Switchgear and control gear
	TC 20	Electric cables
	TC 21	Secondary cells and batteries
	TC 22	Power electronic systems and equipment
	TC 23	Electrical accessories
	TC 29	Electroacoustics
	TC 31	Equipment for explosive atmospheres
	TC 35	Primary cells and batteries
	TC 40	Capacitors and resistors for electronic equipment
	TC 44	Safety of machinery - Electrotechnical aspects
	TC 56	Dependability
	TC 57	Power systems management and associated information exchange
	TC 61	Safety of household and similar electrical appliances
	TC 64	Electrical installations and protection against electric shock
	TC 65	Industrial-process measurement and control
	TC 70	Degrees of protection provided by enclosures
	TC 72	Automatic controls for household use
	TC 74	Safety and energy efficiency of IT equipment
	TC 77	Electromagnetic compatibility
	TC 85	Measuring equipment for electrical and electromagnetic quantities
	TC 89	Fire hazard testing
	TC 101	Electrostatics
	TC 104	Environmental conditions, classification and methods of test
	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology
	TC 109	Insulation coordination for low-voltage equipment
	TC 111	Environmental standardization for electrical and electronic products and systems
	TC 112	Evaluation and qualification of electrical insulating materials and systems
	CISPR	International special committee on radio interference
ISO/TC 11	Boilers and pressure vessels	
ISO/TC 45/SC 1	Hoses (rubber and plastics)	
ISO/TC 115	Pumps	
ISO/TC 118	Compressors and pneumatic tools, machines and equipment	
ISO/TC 122	Packaging	
ISO/TC 131	Fluid power systems	
ISO/TC 145	Graphical symbols	
ISO/TC 197	Hydrogen technologies	
ISO/TC 199	Safety of machinery	

D Objectives and strategies

- To keep TC 105 standards up to date in order to reflect new / changing technologies.
- To standardize fuel cell systems for auxiliary power units and for propulsion other than road vehicles.
- To standardize fuel cell systems of all technologies for distributed generation below 10 kW.
- To consider the standardization need for fuel cell systems and their interaction with the different types of electric storages (as e.g. batteries, flywheels etc.).
- To consider the standardization need for fuel cell systems and their interaction with electrical loads.
- To consider the standardization need for micro fuel cell systems and their interaction with electric storages, especially for medical technology, industrial service, logistic areas and the automotive sector.
- To consider the standardization need for fuel cell systems and their interaction with all-electric systems onboard ships and aircraft.
- To consider the standardization need for fuel cell systems and their hybridization with heat engines as e.g. gas turbines or Stirling engines on a longer term.

E Action plan

- To consider the inclusion of additional designs and fuel types in IEC 62282-6-300. (Target date for IS: 2012-12).
- To consider the harmonization of the safety aspects in the different parts of IEC 62282 series. (The guideline will be available by end of April 2011; the recommendations will be taken into account during the next revision of the relevant standards).
- To standardize fuel cell systems for propulsion and auxiliary power units.
Note: the first edition will concentrate on forklifts, only: Target date for IS: 2014-03).
- The scope of IEC 62282-3-201 shall be expanded from PEFC to all relevant fuel cell technologies (Target date for IS: 2012-03).

F Useful links to IEC web site

[IEC/TC 105 dashboard](#) giving access to Membership, TC/SC Officers, Scope, Liaisons, WG/MT/PT structure, Publications issued along with their Stability Dates and Work Programme.

Name or signature of the secretary

Professor Wolfgang Winkler