Results of the circulation of the first committee draft I**SO/CD 16110** *Hydrogen generators using fuel processing technologies*		ISO/TC 197 doc. **N 287R2 Annex 1**
	Date:2004-06-23	Reference: ISO/TC 197 doc. **N 276**

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MB[1]	**Clause No./ Subclause No./ Annex** (e.g. 3.1)	**Paragraph/ Figure/ Table/ Note** (e.g. Table 1)	**Type of comment**[2]	Comment (justification for change) by the MB	Proposed change by the MB	**Secretariat observations** on each comment submitted
CH	General		ge	We like to inform you, that we don't get any answer from our experts, concerned the mentioned committee draft.		
FR	General		ge	La France n'a pas de commentaire sur le document :* CD 16110 : Hydrogen generators using fuel processing technologies.		
SE	General		ge	We agree to the circulation of the draft as a DIS.		
CA	General		ge	It is important that certain sections in WG8 document (on water electrolysis, ISO/CD 22734) and WG9 document (e.g. controls, testing, ventilation, hazardous locations, etc.) that are equally applicable to both electrolysis and fuel processing technologies are harmonized as much as possible. In this regard, considering that WG8 document is moving towards DIS stage, and WG8 and WG9 have a number of common members, it is recommended that WG9 takes into account the latest revision of ISO/CD 22734 to ensure better harmonization between the two documents.		
NL	All document		Technical	All changes in ISO 16110 clauses discussed during the IEC TC 105 WG 3 meeting in Vancouver should be considered as well for the ISO 16110 draft.		
NL	All document		Technical	A large number of IEC and ISO standards are referenced. A number of this standards, e.g. ISO 4216, ISO 4126-2, IEC 60534-1, mentioned compressor and pump standards, are not or hardly discussed. This could result in additional, unexpected/unnecessary and even conflicting requirements. To prevent this all these standards need to be checked by the group or part of the group. ISO and IEC should therefore provided all referenced standards to (part of) the work group.		
US	General			This standard should be coordinated with the electrolysis draft in ISO/TC 197/WG8 to ensure that the definitions used are the same.		

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US	General		TE	Potential formation of Nickel Carbonyl is not addressed within the standard.	Consider adding section to address hazards related to Nickel Carbonyl.	
US	General		TE	Many reformer / water-gas-shift catalysts are pyrophoric and therefor extremely dangerous to handle.	Consider adding requirement of additional warnings related to pyrophoric items and the proper handling and disposal.	
No	1.2		te	400 Nm^3/h will in a short time become a number of capacity too small. Probably there should be no number of capacity at all.		
US	1.2		te	Nm3/hr (Newton-cubic meters per hour) doesn't make any sense.	Correct the units.	
AR	1.3			Fuel cleanup is defined as follows: Fuel cleanup, in which the fuel may be filtered or desulfurized.	Rewrite as follows: Fuel cleanup, in which the fuel may be filtered and/or desulfurized	
US	1.3	-Frame	ed		Change "hold" to "held" in the first line.	
No	1.4		te	There is no information in the text or technical relationships that can justify this specification of compounds. The technical descriptions cover quite general aspects. This listing of compounds may have the effect of excluding compounds not mentioned, but quite as well suitable for the purpose.		
No	1.5		te	It is a question if such a standard should cover both industrial and residential use, as the technical rules, codes and standards to some degree are different for those areas of use.		
US	1.6		te	This standard does not contemplate all significant hazards. The standard can't contemplate, and there will be one or two additional significant hazards identified that are not currently addressed.	Change the first line to read "This standard addresses significant hazards…"	
US	1.7		te	It is impossible to demonstrate levels of safety and performance equivalent to those prescribed by this standard, so this provision will never be used, and the standard will inhibit innovation.	Consider defining how to demonstrate equivalent safety and equivalent performance.	

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No	2		te	The list of Normative references should be edited. It is improbable that all these standards mentioned could be normative.		
US	2.2.2		ed	ASME 31.3 and B31.1 incorrectly referenced as “ASME/ANSI B31.3” and “ASME/ANSI B31.1”, respectively. Incorrect title used for B31.3. Inconsistent with ISO 15649.	Change “ASME/ANSI” to “ANSI/ASME”. Change B31.3 title from “Chemical plant and petroleum refinery piping” to “Process Piping”.	
No	3			There are all too much definitions. A main rule is that a definition is only needed when it is mentioned in the same document and for clarifying meaning and relationships. Another effect of this list of definitions: Quite common technical issues can make trouble if it is defined, and the same word is mentioned other places in the document meaning something else. An example here: ‘recycling’. Only words and technical phrases having a special or extraordinary meaning in the context of the standard should be defined. It should not be necessary to define words and technical phrases when they are mentioned or defined in normative standards for this document.	The whole list of definitions should be gone through.	
AR	3.32			In the definition of explosive limits it's stated that ISO TR 15916 uses detonable limits. However, the referred technical report clearly distinguishes between flammability and detonability limits	Change the sentence as follows: ISO TR 15916 uses flammable and detonable limits.	
No	3.35		Te	Definition of FisherTropsch liquids is wrong.	FisherTropsch liquids: Liquids derived through a technology based on the FisherTropsch synthesis.	
No	3.36		te	FisherTropsch process This is an example on a definition that is not relevant for this document.		
AR	3.50			In the second sentence used to define the fuel cell the	Change the sentence as follows: A fuel cell is an	

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				production of water isn't considered.	electrochemical device in which hydrogen and oxygen combine in a controlled manner (in contrast to combustion or explosion) to directly produce an electric current, heat and water.	
US	3.80		ed	Spelling error. "tow" Lock-out. "A process in which….one of tow lockout…"	Correction is "two." Lock-out "A process in which… one of two lockout…"	
US	4.1.1	3rd bullet	te	It is unreasonable to ask anyone to reduce risk "as far as possible" through inherently safe design. That requires the designer to do everything that can be done without regard to cost or benefit. This requirement has to be moderated.	Change to read "…eliminated as far as reasonable through the design…"	
US	4.1.1	Paragraph	TE	A statement such as "all foreseeable hazards….must be identified" seems generic and impractical. All applicable standards should be followed which will result in the hazards being identified and mitigated. Suggest this statement be narrowed to better define the risks to be evaluated.		
US	4.2		ed	Incorrect reference. Please note that section 4.2.7 no longer exists. "…and operating conditions specified in 4.2.1. to ~~4.2.7~~."	Replace with proper reference. "…and operating conditions specified in 4.2.1. to 4.2.6."	
US	4.2.2	Bullets	TE	Many hydrogen production systems are located at facilities that have existing storage of hydrogen in liquid or gaseous form. Consideration should be given to the distance requirements and interactions of these systems.	Consider adding bullet stating – to the proximity to other exposures, such as liquefied or gaseous hydrogen storage	
No	4.3.2	Table 4.1	te	The temperatures in the table are extremely low considering that the fuel generator is not an object a human being is resting his hands on. A normal lower temperature level just for touching a surface is 60 ^{o}C. If it is not touchable the surface temperature could be higher.		
US	4.3.2	Table 4.1	Te	The title suggests that these are maximum temperatures. However it appears that these are the same temperature limits as outlined in IEC 60335-1 which are temperature	Change explanation to: " Maximum surface temperature **rise** of external components and containment structures that may be contacted	

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				rises	during operation by users without personal protective equipment."	
US	4.3.2	Table	TE	Surface temperature requirements for personnel protection seem very low. Typical allowable surface temperatures for contact is 140 deg F (60 deg C) for industrial applications.	Consider raising all temperatures in table to 140 deg F (60 deg C)	
US	4.3.2	b	ed	Incorrect reference. Wall, Floor and Ceiling Temperatures "……under the test conditions of section ~~5.10.a~~….."	Replace with proper reference. "…under the test conditions of 5.10.1…"	
No	4.3.7		te	What is the source of this figure? The source should be mentioned (referenced). Exhaust gas containing CO have limits of contents dependent upon where (in which locations) it is released.		
US	4.3.10	Paragraph	TE	Unclear of the intent of this statement. Is documentation of the part or component required? Area classification of system and components should address this concern.	Revise statement to clarify intent.	
AR	4.4.2			Consider to mention the specific case of materials used to construct the desulfurization step of the hydrogen generator.	Specifically in the fuel desulfurization the presence of sulphur compounds as SH2, SH anion, etc. in low concentrations (p.p.m) can form monolayers of metal sulphides on the surface acting as initiators of autocatalytic poisons as iron sulphide for the recombination reaction of two hydrogen atoms to form molecular hydrogen, promoting hydrogen atom absorption increasing the susceptibility to hydrogen assisted corrosion via different mechanisms such as hydrogen embrittlement and hydrogen attack due to the permeation of atomic hydrogen.	
US	4.4.5		Te	This paragraph requires a maximum resistance of 1 mega ohm when tested "in compliance with IEC 61340-2-1." The problem with this requirement is that the IEC 61340-2-1 test methods outline a means for determining static discharge through voltage decay or corona discharge. The methods have nothing to do with measuring resistance.	This standard reference should be dropped and a simple method for measuring resistance with an option for determining the static discharge of the material should be written into the standard's test program. A conductivity test is a fairly simple test to write up.	

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					Also, the option for the static discharge test should be given since many plastics do not have enough carbon or other conductive materials in them to pass the 1 mega ohm requirement. However, they may be able to pass a test to determine if there is a potential for static discharge from the material.	
US	4.5.2	e)	Te	Non-metallic piping should be provided with additional mechanical protection since it is less resistant to mechanical stresses than metallic piping.	f) Non-metallic piping used to convey combustible gases shall be located in a cabinet or guarded to protect against the possibility of mechanical damage.	
NL	4.5.2.1	a	Technical	This clause is already covered by Section 4.4. No need for repetition.	Suggested proposal: delete this clause	
AR	4.5.2.1	b		For better understanding, the verb in the following paragraph should be changed: Venting system parts, including parts within the hydrogen generator, shall not break, disassemble or become damaged to the extent that they permit unsafe hydrogen generator operation, when subjected to a longitudinal force of 223 N and a torque of 34 N-m.	It's suggested to change the word "permit" by the expression "can cause"	
No	4.5.2.1	b)	te	There should be no need specifying any numbers, as the venting systems would have various sizes and dimensions according to amount of flue gas, weather conditions on site and similar aspects.		
NL	4.5.2.1	b	Technical	It is better to vary the requirement of a load of 68 depending on the diameter of the venting system.	Suggested proposal: 68 kg to be changed in *7*Dnom (in mm) with a maximum of 750 N*	
NL	4.5.2.1.	b	Technical	The venting system need to be subjected to both 12 and 68 kg loads. By adding the word 'vertical' in relation with the 68 kg load and 'horizontal' to the 12 kg load, the difference in both requirements is more clear.	Suggested proposal: *Vertical* load of 68 kg *Horizontal* 12 kg impact	
US	4.5.2.1	(b)	te	There is no such thing as a 12 kg impact. The units are	Change to read "…when subjected to the impact of	

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		3rd bullet		incorrect.	a 2 kg steel weight dripped form a height of 6 m." (or whatever is really intended)	
NL	4.5.2.1.	e	Technical	It should be added that the exhaust shall meet local/national requirements as well.	Suggested proposal: openings and overhangs *conform local/national installation requirements.*	
US	4.5.2.1	(e)	ed	More logical sequence.	Move (e) to before (c).	
NL	4.5.2.1	9	Technical	A venting system which is leak tight (clause f) will also be water tight, so no need for this clause.	Suggested proposal: delete this clause	
US	4.5.2.1	(g)	ed	Redundant with (f)	Delete.	
NL	4.5.2.1	h	Technical	Assuming a leak tight venting system the purpose of this clause is not clear.	Suggested proposal: delete this clause	
NL	4.5.2.1	l	Technical	The hydrogen generator should also be evaluated for suction pressure caused by the venting system. In Europe this requirement depends on the type of venting system (suction pressures varies between 50-200 Pa => e.g 200 Pa in case of air inlet at the wall and flue outlet in the roof).	Suggested proposal: The hydrogen generator shall be capable of starting up and shall not shutdown in case of certain suction pressures caused by the type of venting system. Level of the suction pressure will be defined by local/national standards.	
US	4.5.2.1	(l)	te	In some of the areas of the US, a 50 km/hr wind speed is almost an every day occurrence.	Consider raising the wind speed requirement to 80 km/hr.	
US	4.5.2.1	j Paragraph	TE	The requirement that the pressure switches be factory locked is typically a residential or consumer requirement. This is not typical for the industrial applications where all devices are maintained and calibrated on a predetermined schedule by the operator or maintenance workers associated with the plant.	Suggest prefacing this statement with the comment "For residential or consumer users," and add at the end of the statement "The switches used for Industrial applications of the system are not required to be factory calibrated and locked, but shall be calibrated in accordance with the maintenance procedures for the system."	
NL	4.5.2.2		Technical	This clause is already covered by section 4.4, 4.5.1 and 4.5.2 or are typical installation requirements which is not part of the scope of this standard	Suggested proposal: delete this clause	
No	4.5.2.2	h),i)	te	There is no need to specify these relationships with		

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				numbers. Neither will they be the same everywhere.		
US	4.5.2.2	h & I Paragraph	TE	These requirement may be too rigid for some locations.	Suggest adding the following to the end of the statement “or to a safe distance / height as determined by vent dispersion calculations”	
US	4.5.2.3	(b)	te	ISO 15649 has no requirement relating to volume.	Delete “volume”.	
NL	4.5.2.3	c-e	Technical	Sub clauses c, d and e are already covered by section 4.4, 4.5.1 and 4.5.2. or are typical installation requirements which is not part of the scope of this standard	Suggested proposal: delete sub clause c, d and e	
No	4.5.2.3	d)	te	Is there not a colour for hydrogen?		
No	4.5.2.3	e), f)	te	According to the description the Product delivery piping is outside the battery limits of the generator, and could therefore be no part of the hydrogen generator and this standard.		
AR	4.5.2.3	f		In the fourth paragraph it's expressed: Product delivery piping in solid floors shall be laid in channels in the floor and covered in a manner to allow access to the piping with a minimum amount of damage to the installation; as an alternative to installation in channels, the piping shall be installed in a tightly sealing metallic or plastic casing ventilated to the outdoors. Care shall be put on cover design to avoid risky situations.	If a product delivery piping conducting hydrogen is installed in solid floors, the cover of the channels should be open; utilizing safety grating to avoid accumulation of flammable gases.	
No	4.5.4		te	Heat exchangers regards more than water supplies, because the cooling, respective heating, could be by another medium than water. Single wall separation is acceptable when the pressure of the toxic fluid is at least 68.9 kPa. This statement is according to local requirements and not general. The requirements should be generally formulated. Heat exchangers should be designed according to the total pressure and the pressure changes between the sides. The material technical properties of the plates, corrosion resistance of the materials should be in accordance with		

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				the process conditions and other relevant issues.		
US	4.5.4	2nd para.	te	Pressure gradient monitor is not defined in Section 3 as stated here. Using differential pressure to guard against getting toxic fluids in the potable water supply is risky, even with a pressure gradient monitor, whatever that is.	Require the use of a air gap or a back flow preventer between the heat exchanger and the potable water supply.	
No	4.6.1		te	The requirements of the clause are dependent on the localisation of the generator and its purpose.		
No	4.6.1.1		te	Avoiding false measurements being given and to secure ventilation level control negative pressure ventilation could be measured by 2 independent measurements.		
US	4.6.1.1	Paragraph	TE	In some cases, it may be desirable to have positive pressure ventilation versus negative pressure as indicated. In cases where all of the system components are rated for the area classification, this technique should be permitted.	Suggest modifying text to allow positive pressure ventilation in cases where all connecting compartments are either rated for the classification or sealed per the NEC requirements.	
No	4.6.1.2	a)	te	This requirement is probably not realistic unless all connections are welded as a minimum.		
No	4.6.1.2	e)	te	If these drip pans, spill guards shall be open to atmosphere the generator has to be classified area.		
AR	4.6.2	c		IEC 60079-20 for guidance regarding auto-ignition temperatures of various flammable fluids is cited but the reference in Clause 2 is missing.	Add reference to the Part 20 of the IEC 60079 into the Normative references	
No	4.6.2	d)	te	A procedure of having 5 air changes is not a satisfactory measure, as the efficiency may be dependent on flow conditions inside the generator cabinet. A measurement of gas composition connected to the requirement of non-flammable atmosphere is to be recommended.		
No	4.6.4		te	This whole clause is too much detail oriented and in style suitable for a special operation manual. The requirements should be general. The whole clause should be rewritten.		
US	4.6.4		te	To help clarify the meaning of this requirement, I	I recommend the following wording.	

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				recommend modifying the wording somewhat. "Pilot flame ~~supervision shall be only at a point where the pilot will~~ effectively ignite fuel at the main burner even when the fuel supply to the pilot is reduced so the flame is just sufficient to actuate the primary safety control."	"The pilot flame shall be capable of effectively igniting the fuel at the main burner even when the fuel supply to the pilot is reduced to an amount just sufficient to actuate the primary safety control."	
US	4.6.4	f	TE	A flame detector, or fire eye, is typically a high maintenance and costly component. Typical appliances have thermocouples to assure a flame is present. For small hydrogen systems, this may be the economical choice.	Suggest modifying the text to "shall be supervised by a flame detector, or other direct means of verifying burner operation."	
NL	4.6.4	w	Technical	The CO emission requirement for limit testing like blocking the outlet are to severe. At least most non-catalytic will not meet this requirement.	Suggested proposal: increase the max CO exhaust to e.g. 1000 ppm	
NL	4.6.4	w	Technical	Also blocked air inlet should be added to make in inline with clause 5.13	Suggested proposal: w) The hydrogen generator exhaust to atmosphere , under a blocked outlet *or blocked air supply* condition, shall not contain …	
No	4.6.5		te	The clauses 4.6.4 and 4.6.5 should be checked regarding consistency after a new version of 4.6.4.		
NL	4.7		Technical	Section 20 of IEC 60730-1 is a reference to IEC 60664. It is better to make it a direct reference especially since IEC 60664 is a generic standard referenced in many other standards.	Suggested change: shall be in accordance with ~~Section 20 of IEC 60730-1~~ IEC 60664	
No	4.7	Last paragr.	te	"Electrical clearances (through air) and creepage (over surfaces) distances as well as solid insulation thickness for electrical circuits, shall be in accordance with Section 20 of IEC 60730-1" could not be applicable for ex-zone.		
US	4.7	1st par.	Te	It is not clear which standard should be employed. The choice of IEC 60204-1 or IEC 60335-1 is provided as "applicable". How should it be determined as to which one is applicable? The requirements in IEC 60204-1 take a	The manufacturer shall ensure that the electric system design and construction as well as the application of electric and electronic equipment, including electric motors and electric enclosures	

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				very general approach and would be more suitable for a commercial or industrial location. IEC 60335-1 is for residential and light commercial appliances and is written for products that will be used by untrained persons and not subject to maintenance, etc. that would occur in an industrial setting.	meet the requirements of IEC 60204-1 for larger, commercial and industrial units (indicate some size parameter here) and IEC 60335-1 for residential and light commercial use units.	
US	4.8	All	Te	EMC testing is not required in all regions or countries and therefore, should not be a mandatory part of the standard.	This should be included as optional or some statement to indicate that this requirement is applied based upon local and regional codes and ordinances.	
US	4.9.2.2.1	a	TE	Removing all power from the equipment in many cases can cause additional hazards such as not understanding pressures, flows and not being able to operate automatic control valves.	Suggest not removing control power even on safety shutdown provided the control system is rated for the classification.	
US	4.9.2.5	a	TE	Removing all power from the generator may be an issue at any time. During winter operation, heaters, likely electrical, will be required to assure the system does not freeze. The control system will also be required to monitor the system from both hydrogen atmosphere within the component or low temperature.	Suggest revising this statement to “In the off mode, the system shall either vent all flammable gases or continue to monitor / ventilate the enclosure. Alarms to prevent freeze-up of the system, if required, shall also remain active.”	
No	4.9.3		te	There should in addition be temperature sensors and apparatus for pressure measurements for industrial types of generators.		
NL	4.11		Technical	It is not clear what the definitions are of shut-off valves, supply fuel valves. Normally used definitions are Shutt-off valves and safety shut-off valves. Only difference is that safety shut-off valve have additional requirements regarding internal leakage and closing time. Furtherrmore, a number of requirements are already covered by general material requirements and probably IEC 60534-1. No need for repetition. This clause should be simplified.	Suggested proposal: 4.11 Valves 4.11.1 General considerations Valves shall be designed as per IEC 60534-1. 4.11.2 Shut-off valves Supply fuel valves shall meet the following requirements: • electrically, hydraulically or pneumatically	

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					operated shut-off valves shall be of a type that will move to a failsafe position upon loss of actuation energy. • electrically operated valves shall meet the requirements of IEC 60730-2-17 or IEC 60730-2-19 as applicable. • all fuel supplied to the hydrogen generator shall pass through at least two automatic valves, in series, each of which serves as an operating valve and a safety shutoff valve. These valves may or may not be contained in a single control body	
No	4.13		te	All cabinets have to be secured antistatically.		
US	4.13.5	Paragraph	TE	See comment concerning 4.6.1.1 above.		
No	4.16.2	a)	te	Is “outside zones” to be understood “outside danger zones”?		
No	4.16.2	b)	te	‘Standstill’ is a concept not defined. Define and specify what it means.		
US	4.16.2	e)	TE	The statement of “appropriate lighting, where required” can lead to different interpretations from the system developer to the operator or inspector.	Suggest modifying this requirement to have an available outlet (that meets classification) for a work light.	
US	5	Paragraph	TE	Statement of “each new design shall be subjected to qualification tests”. The issue is what constitutes a new design versus a modified design?	Suggest additional qualifiers be added for this statement.	
AR	5.1			It's expressed that a thermocouple or equivalent temperature-measuring device shall conform to IEC 62282-3-2. However, the standard IEC 62282-3-2 is for Stationary fuel cell power plants and it is not in the reference list.	If the standard really applies to this point, add the reference to the Clause 2.	

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No	5.1		te	IEC 62282-3-2 is not mentioned in the list of Normative references. No wonder, because it does not exist.		
No	5.4.1		te	The clause is very detailed oriented and must be connected to some special codes or standards. The details of point a) and b) are not applicable to Europe. ASME B31.3-2002 has a parallel in ISO 15649. Use ISO standard instead.		
US	5.4.1, 5.5.1		ed	ASME B31.3 incorrectly referenced as “ANSI B31.3”. Inconsistent with designation in ISO 15649.	Change “ANSI B31.3” to “ANSI/ASME B31.3”.	
No	5.4.2		te	Use ‘maximum working pressure’ instead of ‘design pressure’ as an estimation basis for test pressure		
No	5.5.1		te	This Leak Test Method for Hazardous Liquids containing portions is not acceptable. It is a too high pressure factor for Europe (Pressure Equipment Directive)		
AR	5.5.2			The results criteria for the total hydrogen generator leak rate for the hazardous Gas containing portions of the system is vague and depends on the ventilation system and the room volume and geometry	Perhaps, the proposed criteria and the safety implications need more discussion.	
No	5.5.2		te	Use ‘maximum working pressure’ instead of ‘design pressure’ as an estimation basis for test pressure and no pressure factor.		
No	5.7		te	The ignition of the gas is not only a matter of voltage level but of flow regulation and mixture of gas/air as well. The characteristics of burner operation are the supplier’s responsibility and the standards for the respective burners. These tests are of no concern for the manufacturer of the generator and the standard for the fuel generator.		
US	5.7	b)	ed	Extra subparagraph b)	Delete b)	
US	5.7		ed	Burner operating characteristics Delete the second “b)” on page since there isn’t any		

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MB[1]	**Clause No./ Subclause No./ Annex** (e.g. 3.1)	**Paragraph/ Figure/ Table/ Note** (e.g. Table 1)	**Type of comment**[2]	Comment (justification for change) by the MB	Proposed change by the MB	**Secretariat observations** on each comment submitted
				wording next to it.		
No	5.8		te	The ignition of the gas is not only a matter of voltage level but of flow regulation and mixture of gas/air as well. The characteristics of burner operation are the supplier's responsibility and the standards for the respective burners. These tests are of no concern for the manufacturer of the generator and the standard for the fuel generator.		
No	5.9		te	This test is for a special size of a vent system. The venting systems would have various sizes and dimensions according to amount of flue gas, weather conditions on site and similar aspects. Further there are probably other means of calculating the strength of the equipment and everything connected to that.		
No	5.9.2		te	There must be other measures to decide what load the vent termination shall tolerate. Functional requirement according to the flow, the weather conditions and so forth. The load specification may vary a lot.		
No	5.10.1		Te	If the size of the hydrogen fuel generator is similar to an ISO container this kind of test is probably not relevant, but if it should be treated like a piece of furniture it may perhaps be different. General functional requirements should be formulated instead.		
US	5.10.1.		ed	Incorrect reference Wall, Floor and Ceiling Temperatures "….whether the requirements of section ~~4.3.2.a~~ are met."	Replace with proper reference. "…whether the requirements of section 4.3.2b are met."	
US	5.11	All	Te	This is too general. It is not clear which standard should be followed and which tests should be included. For example, IEC 60204-1 has a bonding test, dielectric strength test, insulation resistance test, capacitor discharge test and some vague test called "functional tests" which has not been given any specific parameters or methods. IEC 60335-1 has an input test, leakage current and dielectric strength test (as-received, after humidity and	A commercial or industrial hydrogen generator (indicate size limit possibly to clarify) shall be subjected to the following electrical tests from IEC 60204-1: 19.2, 19.3, 19.4, 19.5 and 19.6 (should provide some guidance for 19.6 since it is very vague in IEC 60204-1). A hydrogen generator intended for residential or light commercial use (indicate size limit to clarify if	

1	2	(3)	4	5	(6)	(7)
MB[1]	**Clause No./ Subclause No./ Annex** (e.g. 3.1)	**Paragraph/ Figure/ Table/ Note** (e.g. Table 1)	**Type of comment**[2]	Comment (justification for change) by the MB	Proposed change by the MB	**Secretariat observations** on each comment submitted
				dielectric strength test (as-received, after humidity and after rain), abnormal operation (electrical component fault testing), impact of electrical enclosures, conductor pull tests, insulating aging tests, pull and torque tests on cord bushings, and grounding and bonding tests and resistance to heat, tracking and flammability test for plastics. As noted above, IEC 60335-1 is a standard for household and light commercial appliances. IEC 60204-1 is a standard for general electrical safety and would be appropriate for a larger, commercial or industrial generator. Some distinction such as this should be made to provide guidance as to which standard to use. There should also be a more specific notation regarding which tests should be considered, by including the specific clause numbers of each standard, so that there is no confusion regarding which tests apply.	necessary) shall be subjected to the following electrical tests from IEC 60335-1 as applicable: 10, 13, 15, 16, 19, 20, 22.5, 25.15, 27, 30	
US	5.13	Paragraph	TE	Blocking the stack to perform CO tests on the exhaust could potentially be a dangerous operation.	A more feasible test may be to lower the air flow to the lowest point permitted prior to shutdown of the system and monitor the CO content of the exhaust. The test could then be repeated for burner fuel.	
NL	5.13.2 + 5.13.3		Technical	Reference to section 4.3.7. is incorrect since blocked outlet testing is not normal operation testing as mentioned in 4.3.7 Furthermore the requirements to meet max CO emission of 300 ppm is to server. See 4.6.4 above.	Suggested change: Section 4.6.4 instead of Section 4.3.7	
US	5.13.4		ed	Voltage Variation This test pertains to hydrogen generators that will rely on mechanical means (fan motor) to either 1) bring in process air into the appliance (forced draft) or 2) to help discharge the emissions out of the appliance through the vent system (induced draft).	I recommend the following wording: “This test is performed on hydrogen generators that rely on mechanical means (fan motor) to bring in process air to the hydrogen generator or to vent its emissions.”	

1	2	(3)	4	5	(6)	(7)
MB[1]	**Clause No./ Subclause No./ Annex** (e.g. 3.1)	**Paragraph/ Figure/ Table/ Note** (e.g. Table 1)	**Type of comment**[2]	Comment (justification for change) by the MB	Proposed change by the MB	**Secretariat observations** on each comment submitted
				Therefore, I believe the premise of the following sentence is incorrect. I recommend deleting a segment of the sentence, and rewording. "This test is performed on hydrogen generators that rely on ~~outside air routed through an air intake conduit.~~"		
US	6.3	Par. 3	Te	Should include some guidance for warning markings if statements are employed.	If a warning statement is employed in lieu of a symbol, the statement should include a signal word such as Danger, Warning or Caution; the hazard; and how to avoid the hazard.	
US	6.3		ed	Marking of components "All type of valves, transmitters, motors, pumps and fans shall be *identified* to match the hydrogen generator drawings." For a residential application, are we going to require that a "sticker" or some sort of tag be placed *onto* all valves, pumps, etc. equipped on the hydrogen generator? Can the user's manual or technical documentation be used to identify the valves, pumps, etc. as opposed to physically "tagging" each component?		