



ISO/TC 197
Hydrogen technologies

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Secretariat: SCC (Canada)

CD2 19880-5 Collated comments 2017-07

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Background: Here are the collated comments from the CD2 19880-5 Ballot.
The ballot results are posted as N 868.

Committee URL: <http://isotc.iso.org/livelink/livelink/open/tc197>

Template for comments and secretariat observations

Date:2017-07-13

Document: CD2 19880-5

Project: WG 22

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
FR		Contents		ed	List of subclauses under clause 8 are not listed	Add 8.1 General 8.2 Selection 8.3 Installation 8.4 Inspection and maintenance 8.5 safety precautions and usage	
GB		General		Ge	Feedback/response to the note on ESD associated with ISO/TC 197/WG 22 N38: There is always a risk of static electricity and bonding and grounding are particularly important in hydrogen applications, but I expect that this static electricity would be from surroundings and not from hydrogen gas itself. Theoretically it could be from particles within the hydrogen gas, like rust or dust particles. However, there are no particles in the gas stream delivered to the car (as far as I am aware). So this static electricity does not explain to me how material degradation of the liner inside the dispenser can occur.		
RO		General		ge	In the mail sent on May 12 by NTC Scheduler <applications@iso.org> we note the following note: "Notes on ESD for CD2 19880-5 2017-05", where are mentioned some operational safety issues that need to be taken into account within the development of this draft. Moreover, the procedures for homologation tests are complex and lasting. Therefore, the relevant safety requirements in the above-mentioned note shall be taken into consideration.	Complete the next draft of standard with relevant safety requirements according to those mentioned in NOTE.	
US		General		te	Update the terminology to match the guidance in Annex D of CD2 19880-1. NWP has no meaning on a flowing pressurized system. It characterizes the settled pressure of the full CHSS container(s) on the vehicle.	Change MAWP to Component Pressure Rating. Use the definitions in CD2 19880-1 for consistency with other documents: <ul style="list-style-type: none"> • Component Pressure Rating • MOP • NWP (of vehicle) 	

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JP		Introduction	pp 7 1st bullet		Type A the general public and sunlight can <u>come</u> into contact with, - test 7.3	connecting the dispenser to the fueling nozzle, high pressure and hoses accessible to the public at the fueling site (Type A)	
JP		Introduction	pp 7 2nd bullet		Type B the general public and sun light <u>cannot</u> come into contact with, no cover required.	other flexible hoses used on hydrogen dispensing equipment not accessible to the public or exposed to sun light (Type B).	
RO		Introduction	13-15	ge	“This Standard was developed using the following document: <i>CSA HGV 4.2 Hoses for Compressed Hydrogen Fuel Stations, Dispensers and Vehicle Fuel Systems</i> , under a Copyright License Agreement between CSA and ISO. “ We wonder if the use of the CSA license to develop the standard does not detract from the equality of chances for the producing companies!	It introduces an application limitation, and its future effects shall be removed accordingly.	
US		Introduction	pp 7 1st bullet		Type A the general public and sunlight can <u>come</u> into contact with, - test 7.3	connecting the dispenser to the fueling nozzle, high pressure and hoses accessible to the public at the fueling site (Type A)	
US		Introduction	pp 7 2nd bullet		Type B the general public and sun light <u>cannot</u> come into contact with, no cover required.	other flexible hoses used on hydrogen dispensing equipment not accessible to the public or exposed to sun light (Type B).	
JP		Scope	pp 3 bullets		Add “bullets” to the four items		
US		Scope	pp 3 bullets		Add “bullets” to the four items		
FR		General		ge	As it is drafted, it is not clear that this standard is not compulsory (informative)		
FR		1			You have to exclude from the scope the hoses which are used to fill in station buffers from mobile tanks. Indeed, those hoses are covered by standard ISO 16964 from TC58/SC2.		
FR		1		ed/te	The scope has been modified and now includes hose assemblies. This is better than CD1 However the exclusions of the 3 rd paragraph of the scope are new and unclear and can be understood as what is being excluded is: <u>Either</u> <i>Hose and hose assemblies with thread and seal portion of fittings</i>	Clarify the semantics of the 3 rd paragraph	

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					<p><i>Hoses and hoses assemblies as part of a vehicle used as part of...</i></p> <p><u>Or understood as being only excluded:</u></p> <p><i>Thread and seal portion of fittings used as part of a vehicle on-board fuel storage....</i></p> <p><i>Thread and seal portion of fittings used as part of a vehicle low pressure fuel....</i></p> <p>And why exclude metal hoses which were not excluded in the first draft?</p>		
FR		2		ed	Reference to ISO 8330 is missing	Add reference to ISO 8330 which seems to be a definition standard	
JP		2	Bullet 1		"Search function isn't working after section 8	Where is 19880 - used? Delete?	
JP		2	Bullet 11		"Search function isn't working after section 8	Where is 10619 - used? Delete?	
US		2	Bullet 11		"Search function isn't working after section 8	Where is 10619 - used? Delete?	
GB		3		Ge	Definition of fuelling nozzle missing? (See feedback from previous comments)	Use definition from ISO 19880-1? (for nozzle)	
JP		3.1			Coupling, connector, end-fitting	These terms are not equivalent in this document. Define terms correctly incorporating with the text. Better to add schematic drawing for better understanding. If the term is not used in the text, just list with "also known as".	
US		3.1			Coupling, connector, end-fitting	Settle on a term and only use that term in the document. The others can be noted in the definition as "also known as".	
FR		3.1 3.3		ge	What is the difference between 3.1 and 3.3 they can be grouped together		
JP		3.10			Proof pressure is not defined in ISO 19880-1 and it is just used as "Proof pressure test".	Change "Proof pressure" to "Proof pressure test"	
JP		3.2			dispenser hoses, fuelling hose Is a dispenser hose a Type A hose?	Settle on a term and only use that term in the document. The others can be noted in the definition as "also known as".	

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US		3.2			dispenser hoses, fuelling hose Is a dispenser hose a Type A hose?	Settle on a term an only use that term in the document. The others can be noted in the definition as “also known as”.	
JP		3.3			How is this different than 3.1?		
US		3.3			How is this different than 3.1?		
JP		3.4			Tweak	<u>An assembly consisting of a</u> length of hose with a coupling or fitting attached to both ends. <u>The assembly hose</u> may include exterior materials which <u>cover and</u> protect cover and/or user from any damage .	
US		3.xx			Add	Hose – semi-finished hose assembly;	
US		3.4			Tweak	<u>An assembly consisting of a</u> length of hose with a coupling or fitting attached to both ends. <u>The assembly hose</u> may include exterior materials which <u>cover and</u> protect cover and/or user from any damage .	
US		3.5			Harmonize terminology with approved CD2 version of ISO 19880-1. Change MAWP to component pressure rating.	<i>Change the term and use this term where MAWP is used:</i> component pressure rating maximum allowable pressure at which it is permissible to operate a component as specified by the manufacturer at a specified temperature. Note 1 to entry: Components designed to the Maximum Allowable Pressure per the European PED represent the component ratings by the manufacturer that as indicated by the value of “PS”. Note 2 to entry: Further guidance on dispenser pressure terminology is included as Erreur ! Source du renvoi introuvable..	
GB		3.5 & 4.2 (and throughout)			MAWP Check for consistency with draft of ISO 19880-1 and consider use of “component rating” (MAWP is for a system in WG24)	Please reconsider definition based on WG24 discussion	
US		3.6	Note	te	The note makes no sense on the dispenser or anywhere else in the filling station. It is valid only	Delete.	

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					for the CHSS container on vehicle.		
GB		3.6 & 4.2			MOP Check for consistency with draft of ISO 19880-1	Please reconsider definition based on WG24 discussion and use of term – is this term actually needed in Table 1? (Could a reference to ISO 19880-1 suffice?)	
JP		3.7			As for pressure terms, rearrange to integrate all pressure terms.	Move all pressure terms together at one place. Confirm the pressure terms match with those in ISO 19880-1	
US		3.8			Definition is not correct. NWP relates to the vehicle and not the dispenser system or the hose. Harmonize terminology with approved CD2 version of ISO 19880-1.	<i>Replace definition and notes as follow:</i> nominal working pressure NWP pressure of a full vehicle CHSS at a gas temperature of 15 °C Note: The NWP characterizes the service level for determination of dispenser MOP and component pressure rating.	
GB		3.8 & 4.2			NWP Unless these hoses are for use in vehicles, NWP is not needed here. WG24 is using “Hydrogen service level”	Please reconsider definition based on WG24 discussion and use of term. This may be better replaced in Table 1 with Hydrogen service level, HSL, and then a reference to see ISO 19880-1?	
JP		3.xx			Add	Hose with appropriate definition	
FR		4.1	note	ed	The term “nozzle vent hose” is used but it is not defined. This term is unclear and needs to be defined		
JP		4.1	Bullet 1			Type A: A dispenser hoses assembly connecting the dispenser to the fueling nozzle, <u>accessible to the public.</u>	
JP		4.1	Bullet 2			Type B: Other flexible hose <u>assemblies</u> used on hydrogen dispensing equipment, not accessible to the public.	
US		4.1	Bullet 1			Type A: A dispenser hoses assembly connecting the dispenser to the fueling nozzle, <u>accessible to the public.</u>	
US		4.1	Bullet 2			Type B: Other flexible hose <u>assemblies</u> used on hydrogen	

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						dispensing equipment, not accessible to the public.	
US		4.1	Note		The note is confusing.	<i>Change the note (or delete it):</i> Depending on the specific dispenser design, the MOP and component pressure rating may be less than that of the dispensed fuel.	
FR		4.2	note table 1	ed	Lack of “to” in sentence “may not be limited classes shown.”	"may not be limited to classes shown.."	
GB		4.2	All	Ge	Unnecessarily complicated – just say that these pressures are for Type A hoses	Change to: “Type A hose assemblies shall be designated according to five pressure classes....” And remove the Note	
US		4.2	Table 1	te	MOP is only defined for the dispenser system. There is no specific target system application for Type B hoses, and therefore MOP is not defined. Typical practice is to assume MOP could be as high as component pressure rating. Component pressure ratings can be greater than or equal to the system MAWP and therefore the values in the table.	<i>Harmonize the terminology with CD2 19880-1:</i> Change title of row 2 from “NWP” to “Dispenser Service Level for Type A Hoses”. Modify note A to “Equal to the maximum Nominal Working Pressure (NWP) of vehicles to be fuelled”. Modify note B to indicate that the values for MOP for Type A hoses and Component Pressure Ratings for Type A and B hoses are based on ISO 19880-11. Modify note C to indicate that Type B hoses are assumed to have a MOP equal to the Component Pressure Rating to be conservative. Update the table to show MOP values for both Type A and B hoses. The MOP of Type A hoses is as indicated on the current table. The MOP of Type B hoses should point to Note C (as modified). Replace MAWP with Component Pressure Rating and show each value as “≥”. Also change from note reference from “C” to “B”.	
GB		4.3	All	Ge	Is the intention for all dispenser hoses to meet T1? If so, this could be as a minimum a useful note, if not a requirement for fuelling hoses?	NOTE: Fuelling hoses should be designed to be T1.	
FR		5.1	3 rd par.	te	The third paragraph should be deleted. A standard cannot decide that all existing hoses on the market are correct according to this new standard and that	It is not possible to write such assertions in an ISO standard. Delete or change the requirement	

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					the new products must prove their equivalent performance. The standard should clearly defined all the expected requirements with the corresponding tests.		
DE		5.2	Paragraph	editorial	NuDEer should be 10 ¹⁵ , otherwise not consistent with background; But why? The fluid is dry H2	Change NuDEer to 10 ¹⁵	
FR		5.2	2 nd par.	te	There is no test to measure the dielectric breakdown voltage of the liner thickness. A test should be added or the requirement should be deleted.		
GB		5.2		Te	The focus of the standard although addressing both A and B type hoses is effectively A as this is the hose in 5.2. The limit of 10 to 15 ohms Cm would indicate that the material is most insulative.		
JP		5.2	pp 1		Clarity	The lining shall be of uniform thickness and free from defects. Defects <u>are defined as may include</u> but not limited to bubbles, thinning, gouging or discoloration,	
JP		5.2	pp 2		Clarity	10¹⁵ Ωcm <u>10¹⁵ Ωcm</u>	
US		05.2	pp 1		Clarity	The lining shall be of uniform thickness and free from defects. Defects <u>are defined as may include</u> but not limited to bubbles, thinning, gouging or discoloration,	
US		5.2	pp 2		Clarity	10¹⁵ Ωcm <u>10¹⁵ Ωcm</u>	
GB		5.5		Te	This would seemingly indicate a requirement for dissipation along the hose, it is not clear if this is internal, external or both, the limit that should be applied would suggest 3x 10 to the 5 and 10 to the 9.		
JP		5.5			Static electricity dissipation	<u>The hose assembly shall be constructed so that the liner provides and adequate internal layer of prevention to avoid generating an electrical charge in the fluid during normal use.</u>	

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US		5.5			Static electricity dissipation	<u>The hose assembly shall be constructed so that the liner provides and adequate internal layer of prevention to avoid generating an electrical charge in the fluid during normal use.</u>	
GB		5.5 (&7.4)	All	Ge	Isn't there a minimum requirement missing here? In 7.4 this is written in a test as 1MΩ per meter for Type A hoses? Is this consistent with the current need in ISO 19880-1 to ensure: "The total electrical resistance between the (vehicle) end of the fueling nozzle to the station electrical ground should be a maximum of 1000Ω."	Consider in light of ISO 19880-1 statement, and either include minimum requirement here, or change 7.4 requirement. Please advise WG24 of the outcome.	
US		5.6			Electrical bonding	<u>The hose assembly</u> Hose assemblies shall be constructed so as to provide an <u>external</u> , electrically conductive, <u>bonding</u> path between <u>the</u> couplings to dissipate <u>external</u> static electricity <u>charges</u> .	
JP		5.x			Electrical bonding	<u>The hose assembly</u> Hose assemblies shall be constructed so as to provide an <u>external</u> , electrically conductive, <u>bonding</u> path between <u>the</u> couplings to dissipate <u>external</u> static electricity <u>charges</u> .	
US		6.1			This is non-normative. Is it needed?		
JP		6.2			As dimension of ID and OD are typical, concentricity also should be typical	Add typical before concentricity	
US		6.2			This is normative. It is needed.		
FR		6.3		te	the new requirement does neither refers to any temperature nor to any endurance for the test. I think it is not acceptable for the intended use.	The test must be really relevant to the intended use.	
GB		6.3		Te	With reference to the bend radius for different hose families would this be applicable, we have noted that for certain hose constructions the diameter of the O/D remains within the limit but the internal has been significantly damaged during this type of testing, is there a need to add an internal inspection, or cross section to augment the clarity of the test?		

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JP		6.3	pp 1		Are we going to reject an eight mm H35 hose because the MBR is 220 mm? We will reject something that does not validate the manufacturer's literature.	Use a test piece having a length at least four times the minimum bend radius. Measure the hose outside diameter with calipers in the straight-lay position before bending the hose. Bend the hose through 180° to the minimum bend radius (see manufacturer's literature Table 4) and measure the flatness with the calipers. Typical values are shown in table 4.	
JP		6.3	pp 2		Enable, do not limit.	When the hose is bent to the minimum bend radius given in manufacturer's literature Table 4 , measured on the inside of the bend, the flatness shall not exceed 10 % of the original outside diameter.	
US		6.3	pp 1		Are we going to reject an eight mm H35 hose because the MBR is 220 mm? We will reject something that does not validate the manufacturer's literature.	Use a test piece having a length at least four times the minimum bend radius. Measure the hose outside diameter with calipers in the straight-lay position before bending the hose. Bend the hose through 180° to the minimum bend radius (see manufacturer's literature Table 4) and measure the flatness with the calipers. Typical values are shown in table 4.	
US		6.3	pp 2		Enable, do not limit.	When the hose is bent to the minimum bend radius given in manufacturer's literature Table 4 , measured on the inside of the bend, the flatness shall not exceed 10 % of the original outside diameter.	
FR		7		te	The performance paragraph is mixing type testing and production testing. This should be changed and a specific paragraph for production (or routine ?) testing should be written.	Reorganize the CD to include a separated paragraph for production tests if needed.	
GB		7	Chapter title	Ed	Is "Performance" the correct title? Many of these a safety related. Minor point, but should this be called "Tests" or "Testing"?	Consider, and replace if appropriate	

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JP		7.		te	Regarding the test which is conducted continuously a long period of time, need to consider not to throw the previous successful data when a failure occurs or false data are collected at the end of the test,	To be considered	
FR		7.1		te	The hose to be tested shall be the final hose, not one with cover allowed to be perforated if the actual and distributed product is not so.		
DE		7.1.1	Paragraph	editorial	The Unit should be Ncm ³ /(h*m), The "N" must be in front of the cm ³ .	Change the Position of the "N" and add the "m" in the denominator. For this the NuDEer of 20 must be changed to 40, because the free length of the test piece is defined to 0.5m.	
F		7.1.1	1 st par.	ed	The ISO unit is Ncm3 not cm3N		
FR		7.1.1	2 nd par.	ed	The sentence is not right: "Test can be done at room temperature. The amount shall be converted to 15 °C using equation listed clause 8.12."	The sentence should be: "Test can be done at room temperature. The amount shall be converted to 15 °C using equation listed clause 7.12."	
JP		7.1.1			Leakage is not an hourly rate. Take "/h" from the requirement	Change clause 7.1.1 not to length of hose.	
US		7.1.1			Didn't we agree to hourly permeation (diffuse) of less than 500 ml/hr-m and local leakage of 200 ml/hr within a 1 sqcm point on the hose assembly?	Use values that were previously agreed to: <ul style="list-style-type: none"> less than 500 ml/hr-m and less than of 200 ml/hr local leakage within a 1 sqcm point on the hose assembly. 	
FR		7.1.1 7.1.2			The § 7.1.1 and 7.1.2 are incoherent: for a type test of 5min the requirement is 20 Ncm3/h at MAWP and for a routine test during an undefined number of minutes the requirement is no leakage without any specification for the applied pressure. This lack of details is not acceptable for this standard at this stage.	The tests should be better described.	
DE		7.1.2	Paragraph	technical	For the Method B with the gas leak detector or the snoop liquid leak detector, there is no time how long the pressure should be applied, and how long is the observation	Insert the comment "should be observed for 5 min."	

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GB		7.1.2		Te	Add a note to say that the commencement of the test should be delayed to allow a hose to settle and reach a steady state prior to commencing the test.	Add a note to say that the commencement of the test should be delayed to allow a hose to settle and reach a steady state prior to commencing the test.	
US		7.1.2			Why are the type A and type B hose tests different? The differences between the hose types is the degree of contact with people during normal use (this is zero for the type B).		
FR		7.2			Delete "this is a non-destructive test" since it is described to be so.		
FR		7.2.2			It is not possible to require 4 times MOP and then add that the test shall be performed according to a national standard. This document is an ISO document, hence international. It should specify a minimum requirement meeting an adequate safety level that both manufacturers and users have agreed. Also I am not sure that a hose will pass 3500 bar.		
US		7.2.2			Let's simplify, MAWP (the system requirement) and rated pressure (the component requirement). Rated pressure \geq MAWP	Following the oven aging, when tested in accordance with ISO 1402, a hose assembly shall withstand without bursting or visible loss of fluid <u>a minimum with the pressure of 4 times of MOP 3.6 times Component Pressure Rating</u> for 5 min.	
GB		7.4		Te	By specifying this limit the hose is closer to be conductive and negates a considerable range that would be considered to be dissipative, should this be the same inside and out if the hose construction different cross sections of hose should be considered.		
US		7.4			Electrical Conductivity This matches 5.x in the comments	Type B hoses are expected to be relatively short. Test for hoses longer than 1 meter? And either connect to bond surfaces, or intentionally not connected to bonded surfaces (electrical dielectrics).	
CA		7.4 Electrical Conductivity		Ed	<i>"When determined in accordance with clause 4. 8 of ISO 8031:2009, electrical resistance between couplings at each end of a dispenser hose shall not exceed 1MΩ per meter, in order to dissipate static electricity. This test shall be conducted with the hose un-pressurized. For Type B Hose: TBD"</i> Does the requirements in para A only apply to Type A hoses? If so, then state this. At least it should be stated until it is known if Type B hoses are to have separate requirements.	<i>"For Type A hoses, when determined in accordance....."</i>	

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DE		7.6	Paragraph	editorial	The ISO 6802 missing the year	Insert the year of the ISO 6802:2008	
CA		7.6 Torsion Strength	1 st para	Ed	Hanging paragraph. Needs a subheading. This also means current "7.6.1 Test Conditions" must become 7.6.2	7.6.1 Applicability	
US		7.7	pp 2		Verify that the nozzle/receptacle requirements in ISO 17268 are to definitely disconnect at less 3000 N.	A hose assembly shall withstand a longitudinal pull force of 3 000N without structural damage or leakage after being subjected to accelerated air oven aging. The hose must comply with Section 7.2.1 Hydrostatic Proof Test and Section 7.5 Electrical Conductivity after the tensile test.	
CA		7.7 Tensile Test of Hose Assembly	1 st para	Ed	Hanging paragraph. Needs a subheading. This also means current "7.7.1 Test Methods" must become 7.7.2	7.7.1 Applicability	
CA		7.7.1 Test Methods	2 nd para	Te	<i>"Following the oven aging, the hose assembly shall be maintained at room temperature for 2 h prior to the conduct of the tensile test."</i> Is the 2 hour hold at room temperature for the purpose of having the hose at room temperature for the tensile test, or is it to have the hose cool to some temperature higher than room temperature for the tensile test? If the former, then delete the 2 hours, and simply state the test is performed at room temperature. If the latter, then specify the temperature range the hose should be tensile tested at. There is no guarantee that 2 hours of cooling is going to provide the desired temperature for testing – with undefined cooling conditions, every test lab would have a different amount of cooling for a 2 hour period.	<i>"Following the oven aging, the hose assembly shall be maintained at room temperature for 2 h prior to the conduct of <u>during</u> the tensile test."</i>	
CA		7.8	1 st para	Te	It says...." <i>When tested in accordance with method 1 of ISO 7326: 2006, depending on the nominal size of the hose, a hose outer cover shall show no visible signs of cracking...</i> ". What does "depending on the size of the hose" mean? This is not explained in 7.8. If it is not explained, it is meaningless.	Delete "depending on the nominal size of the hose,"	
JP		7.8	New pp 1		Missing requirement	<u>This test shall be applied to Type A and Type B hose assemblies.</u>	
US		7.8	New pp 1		Missing requirement	<u>This test shall be applied to Type A and Type B hose assemblies.</u>	

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JP		7.9			clarity	This test shall be applied to Type A <u>and Type</u> B hose assemblies.	
US		7.9			clarity	This test shall be applied to Type A <u>and Type</u> B hose assemblies.	
CA		7.9 Corrosion Test	1 st para	Ed	Hanging paragraph. Needs a subheading. This also means current "7.9.1 Test Conditions" must become 7.9.2	7.9.1 Applicability	
DE		7.5	Paragraph	technical	The Test 7.7 Test of hose asseDEly includes this test. Same Test with more load and more specifications.	Delete the Paragraph	
DE		7.10	Paragraph	editorial	The ISO 6803 missing the year	Insert the year of the ISO 6803:2010	
DE		7.10	Paragraph	technical	Malfunction should be limited to the test piece	...malfunction of the test piece...	
DE		7.10	Figure	technical	Key a of the Figure 1 is defined in ISO 6803:2010, use the definition of this standard.	Change it to accordance of the ISO 6803:2010: The rate of pressure rise is the slope of the secant pressure rise, expressed in MPa/s. The nominal rate of pressure rise shall be equal to that given by Equation (1): $R = f(10p - k)$ where: R is the rate of pressure rise, in MPa/s; f is the frequency, in Hz; p is the nominal test pressure, in MPa; k = 5 MPa The tolerance is +-10% of the calculated nominal value.	
DE		7.10	Figure	technical	Key c of the Figure 1 is defined in ISO6803:2010 for high pressure hoses (more than 3 MPa) between 0.5 Hz and 1.3 Hz. (see 6803:2010 Paragraph 8.2 Line1)	Change in accordance to the ISO 6803:2010: 8.2: "...apply a pulsating pressure internally to the hose asseDElies at a uniform rate between 0.5 Hz and 1.3 Hz for the high-pressure test ..."	
JP		7.10	New pp 1		Missing requirement	<u>This test shall be applied to Type A and Type B hose assemblies.</u>	
JP		7.10	Fig.1	te	"P±5%" is wrong. Should be "±5%"	<u>Change to "±5%"</u>	

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US		7.10	Para 1 and 3	TE	Many of the issues associated with hoses are due to low temperature operation and thermal cycling between -40C and ambient. The cycle test should be done at both high and low temperature. I believe that the cycle test should be alternate between highest and lowest temperature but would be open to other options if there is a lower cost method to achieve thermal cycling.	When tested in accordance with ISO 6803, the test fluid temperature shall be at the highest <u>and lowest</u> temperature of the hose being rated. The pressure rise shall be contained within the wave form envelope as shown in Figure4. The test fluid for this test is water or mixture of water and glycol or oil. When tested at impulse pressure equal to 100 % of the maximum operating pressure, the hose shall withstand a minimum of 4050 1000 impulse cycles <u>alternating between the highest and lowest temperature rating.</u>	
US		7.10	New pp 1		Missing requirement	<u>This test shall be applied to Type A and Type B hose assemblies.</u>	
US		7.10	Para 8	TE	The hose should be required to pass the leakage test to ensure there are no failures using hydrogen as the working fluid	There shall be no leakage or other malfunction before reaching the specified number of cycles. <u>The hose shall comply with Section 7.1 Leakage Test at the end of the cycles</u>	
CA		7.10 Pressure Cycle Test (Impulse Test)	1 st para	Te	<i>“The pressurization shall be stopped and the impulse test unit shall be allowed to cool down the temperature of the test fluid to room temperature at every 30 000 cycles of impulse cycles.”</i> The test does not state a maximum temperature for the test fluid. It does not state what “room temperature” is. This means the results between test labs will have different test conditions. One needs to specify the test temperature conditions.	Add the statement, <u>“During pressure cycling the fluid temperature shall be monitored, and shall range between 25°C and 65°C. The pressurization shall be stopped and the impulse test unit shall be allowed to cool down the temperature of the test fluid to between 15°C and 25°C room temperature at after every 30 000 cycles of impulse cycles.”</u>	
CA		7.10 Pressure Cycle Test (Impulse Test)	6 th para	Ed	<i>“At every cool down, check test assemblies to ensure they are clean and dry. With oil heater turned off.....”</i> In para 2 it allows; <i>“The test fluid for this test is water or mixture of water and glycol or oil.”</i> So the term “oil heater” is inappropriate.	<i>“At every cool down, check test assemblies to ensure they are clean and dry. With oil fluid heater turned off...”</i>	
DE		7.12	Paragraph	editorial	The Unit should be Ncm ³ /h*m, The “N” must be in front of the cm ³ .	Change the Position of the “N” and add the “h” in the denominator.	

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NZ		7.12		te	500 cm ³ N/m	500 Ncm ³ /m	
US		7.12			We believe the WG came to the conclusion that permeation is diffuse leakage and should be in ml/hr-m and leakage is local and should be in ml/hr. For safety reasons, we agreed total leakage should not exceed 500 ml/hr-m and local leakage should not exceed 200 ml/hr (below the point of a sustained flame).		
CA		7.12 Hose Permeation	1 st para	Ed	Hanging paragraph. Needs a subheading. This also means current "7.12.1 Test Method A" must become 7.12.2, etc.	7.12.1 Overview	
JP		7.12.1		te	"Repeat the measurement a further two times" is not sufficient. Need to specify when the next measurement is conducted	Add "the next measurement shall be conducted within 24 hours"	
JP		7.12.1		ed	7.12.1 Test Method B should be 7.12.2	Change to 7.12.2	
NZ		7.12.1		ed	flaw	flow	
JP		7.12.2		ed	7.12.2 Description of the result should be 7.12.3	Change to 7.12.3	
NZ		7.12.2		ed	Covert, ammount, Satulated	Convert, amount, Saturated	
DE		7.13	Paragraph	general	The Paragraph is only informative A Standard should be describe only the state of the Art and no informal things.	Delete the complete paragraph, because it is informative.	
JP		7.14			Crush shouldn't be an issue if the hose isn't laying on the ground away from the plinth. A 3 meter hose connected to a 2.3 meter high breakaway, as is currently done with petroleum dispensers should see a lot of crushing, if any.	<u>This requirement only applies to a Type A hose assembly of more than 3 m or for applications where crushing is a credible failure mode (special order).</u>	
US		7.14	Para 1	TE	The crush test should be mandatory even for regions that have requirements that prevent the hose from touching the ground. The likelihood of a hose being damaged by crush is high. The severity of a crush damage on the hose is very high because there is no method of flow control	7.14 Optional Crush Test This provision applies to a single Type A hose only. If required based on regional dispenser design, A dispenser hose assembly shall withstand a force of 8900 N applied externally without incurring structural damage or leakage.	

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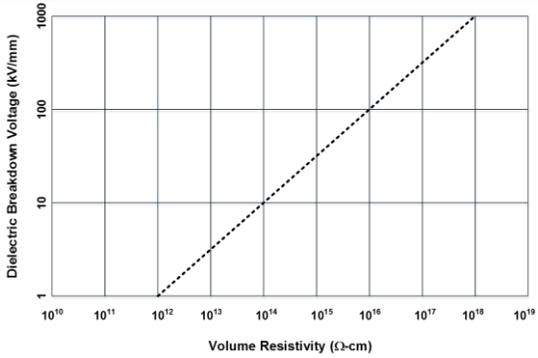
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					and the leak could affect the user and public in surrounding area. In addition, car doors, collisions are other sources of “crush” damage. Because the station operator is unlikely to know the difference between a hose which passed the crush test versus one which has not, the default should be to require the crush test, unless it is specifically excluded.		
US		7.14	Para 1	TE	The hose should be required to pass the leakage test to ensure there are no failures using hydrogen as the working fluid	The weight shall then be removed and the hose subjected to and shall comply with Sections 7.1 Leakage Test 7.2.1 Hydrostatic Proof Test and 7.4 Electrical Conductivity.	
US		7.14			Crush shouldn't be an issue if the hose isn't laying on the ground away from the plinth. A 3 meter hose connected to a 2.3 meter high breakaway, as is currently done with petroleum dispensers should see a lot of crushing, if any.	<u>This requirement only applies to a Type A hose assembly of more than 3 m or for applications where crushing is a credible failure mode (special order).</u>	
JP		7.15			Abrasion shouldn't be an issue if the hose isn't dragged. A 3 meter hose connected to a 2.3 meter high breakaway, as is currently done with petroleum dispensers should see a lot of dragging, if any.	This provision applies to a single Type A hose only <u>This requirement only applies to a Type A hose assembly of more than 3 m or for applications where abrasion is a credible failure mode (special order).</u>	
US		7.15			Abrasion shouldn't be an issue if the hose isn't dragged. A 3 meter hose connected to a 2.3 meter high breakaway, as is currently done with petroleum dispensers should see a lot of dragging, if any.	This provision applies to a single Type A hose only <u>This requirement only applies to a Type A hose assembly of more than 3 m or for applications where abrasion is a credible failure mode (special order).</u>	
CA		7.15 Optional Abrasion Resistance Test	1 st para	Ed	“When requested by customer or where regional dispenser designs warrant, Dispenser hoses must meet ISO....”. Is “Dispenser hose” the same as Type A hose? If so, make a global change of Dispenser hose to Type A hose throughout the document.	When requested by customer or where regional dispenser designs warrant, <u>Type A Dispenser hoses....”</u>	
JP		7.16				Electric properties This test shall be applied to Type A and Type B hose lining materials, unless otherwise the electric properties are not available from the material manufacturers.	

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US		7.x			<p>ESD This matches 5.6 in the comments</p> <p><i>Please verify IEC 60993 and JIS K6911 are equivalent to ASTM D257.</i></p> <p><i>Please verify IEC 60243 and JIS K6249 are equivalent to ASTM D149.</i></p> <p><i>If they are equivalent, can we reference all of them?</i></p>	 <p>Electrostatic Dissipative Properties of the hose liner</p> <p>Determine the volume Resistivity of the hose liner per ASTM D257 or equivalent and the Dielectric breakdown strength of the hose liner per ASTM D 149 or equivalent and plot in the figure above. Hose liner material data to the left of the dotted line is acceptable. Hose liner material data to the right of the dotted line is questionable.</p> <p>For questionable materials, determine the surface resistivity of the hose liner per ASTM D257 or equivalent, and calculate the applications parameters (maximum gas flow, the “liner path length” and the “wetted perimeter”). Based on these properties and parameters, is generating a potential charge that would exceed the dielectric breakdown strength of the hose liner previously determined a credible failure.</p>	
JP		7.16.1				<p>Dielectric breakdown voltage</p> <p>When determined dielectric breakdown voltage of liner material in accordance with IEC60243-1, the product of dielectric breakdown voltage of liner material and liner thickness shall exceed 10kV, in order to be proof against the potential arose by static electricity.</p>	

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JP		7.16.2				Volume resistivity When determined in accordance with IEC60243-1, volume resistivity of liner material shall not exceed 1015□cm, in order to avoid charging static electricity.	
JP		7.x			ESD This matches 5.6 in the comments	See Below.	
JP		7.X			There is no test to determine the material electrostatic dissipative property	Methods for measurement shall be written in the clause 7. IEC standards are suitable for describing the methods for electric properties measurement. IEC 60093 for the method of volume resistivity and surface resistivity have changed to IEC 62631-3-1:2016 for volume resistivity and IEC 62631-3-2:2015 for surface resistivity. IEC60243 can be IEC60243-1 for dielectric breakdown voltage. Section 7.16 shall be written as follows;	
GB		8 & 9	all	Ed	Should marking and documentation be the other way around?	Correct if appropriate	
GB		8.2	b	Ge	Is it impossible for a hose built to ISO 19880-5 to be appropriate for use in a vehicle if the other vehicle specific requirements are met? Is there something fundamental about this document, other than this statement, that precludes such a hose being used in a vehicle?	Please clarify what prevents it from being used, and if nothing other than this statement, either remove, or amend to something like: "The hose shall not be used in a vehicle, <u>unless other relevant requirements for vehicle hoses are also met</u> "	
DE		8.3	Paragraph	editorial	In the listing "c" starts a new point a, "a" is already defined.	Take this point to the end of the listing and define it to f	
GB		8.3	a	Ge	The rated pressure of the hose must not be exceeded (nor any other parts of a pressure system, but that is out of scope of this document) – the system MAWP shall not exceed the hose rated pressure. Also, is the user the correct term? For a dispenser, this is a member of the public filling their vehicle?...	Clarify with appropriate language, for instance: The rated pressure of the hose must not be exceeded; the installer of the hose assembly into a pressure system must ensure that overpressure protection is appropriate to prevent operation of the hose at pressure higher than the rated pressure.	
GB		8.3	c	Ed	Language is confusing. Also, is the "a." half way through a typo?	Please clarify what is meant	
GB		8.3	all	Ed	Inconsistent use of ; and . at the end of each item in the list.	Correct typo	

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JP		8.3	c		Clarity	The hose shall not be used if bent tighter less than the manufacturers' specified minimum bend radius for the hose. a. The hose shall not be stretched, kinked, twisted or torqued or damaged in anyway;	
JP		8.3	d		Clarity	The hose assembly shall provide protection for the user from contact damage injury (thermal)	
JP		8.3	e		The hose manufacturers' need to be clear on what the rated pressure and operating temperature ranges of the hose assemblies are	<u>Include warning in instructions:</u> "The hose shall not be subjected to temperatures outside the temperature limits"	
JP		8.3	e		Miss one	<u>Include warning in instructions:</u> "The hose assembly shall be removed from service and destroyed in the event of mechanical, chemical or environmental damage"	
JP		8.3		ed	a. The hose shall not be stretched, kinked, twisted or torqued; should be separated as "d." the current "d." and "e" should be changed accordingly	Rearrange the numbering	
US		8.3	a		The hose needs to tolerate a failure where the MAWP is reached. This is the dispenser manufacturer and station owners' responsibility. The hose manufacturers' need to be clear on what are the rated pressure and operating temperature ranges of the hose assemblies.	<u>Include warning in instructions:</u> "Operation above the component pressure rating and temperature rating is not permitted." MAWP must not be exceeded; the user must provide overpressure protection to prevent operation of the hose at pressures greater than the MAWP;	
US		8.3	c		Clarity	The hose shall not be used if bent tighter less than the manufacturers' specified minimum bend radius for the hose. a. The hose shall not be stretched, kinked, twisted or torqued or damaged in anyway;	
US		8.3	d		Clarity	The hose assembly shall provide protection for the user from contact damage injury (thermal)	
US		8.3	e		The hose manufacturers' need to be clear on what the rated pressure and operating temperature ranges of the hose assemblies are	<u>Include warning in instructions:</u> "The hose shall not be subjected to temperatures outside the temperature limits"	

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US		8.3	e		Miss one	<u>Include warning in instructions:</u> "The hose assembly shall be removed from service and destroyed (or returned to the manufacturer) in the event of mechanical, chemical or environmental damage"	
JP		8.4	b		Add	<u>Include warning in instructions:</u> "The hose assembly shall be removed from service and destroyed in the event of mechanical, chemical or environmental damage"	
US		8.4	b		Add	<u>Include warning in instructions:</u> "The hose assembly shall be removed from service and destroyed (or returned to the manufacturer) in the event of mechanical, chemical or environmental damage"	
JP		8.5	c		Add	<u>Include warning in instructions:</u> "The hose assembly shall be removed from service and destroyed in the event of mechanical, chemical or environmental damage"	
US		8.5	c		Add	<u>Include warning in instructions:</u> "The hose assembly shall be removed from service and destroyed (or returned to the manufacturer) in the event of mechanical, chemical or environmental damage"	
GB		9.1		Te	Makes reference to a notified body, if this is a requirement it needs to be identified elsewhere in the text, including the definition of their involvement. (Is the intention to gain product certification for the product if so should we make reference to a design file and independent validation?)	Make reference to notified body in text.	
DE		9.2	Paragraph	general	In the NOTE is named f, but "f" is not defined in the Paragraph	Delete it Or define it	

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GB		9.3		Te	It is conceivable that other method of marking would be considered. Consider adding: g) any other environmental and application durable marking method (or similar words)	Add: g) any other environmental and application durable marking method (or similar words)	
DE		10	Paragraph	general	Why have to be repeated the qualification to ISO 19880-5 every five years, if there is no change in the method of manufacture or materials used occurs?	Delete the Requalification for every five years.	
JP		10	pp 2 2 nd sentence		Typo	(The tests shall be repeated at a maximum of five-year intervals, or whenever a change in the method of manufacture or materials or materials used occurs).	
US		10	pp 2 2 nd sentence		Typo	(The tests shall be repeated at a maximum of five-year intervals, or whenever a change in the method of manufacture or materials or materials used occurs).	
GB		10 & 11	all	Ed	These include requirements relating to testing?	Move further forward to ensure this is clear.	
GB		10 & Annex B		Ge	Regarding routine testing: <ul style="list-style-type: none"> ISO 19880-5 has it as an informative (optional) Annex for hoses for a very small number of hoses ISO 17268 has nothing at all as far as I'm aware It was suggested in comments about ISO 19880-3 that routine testing is required for valves. There is a really large inconsistency currently between these three critical dispenser component standards...	Can this be made consistent across all HRS component standards?	
GB		11	Para 1	Ed	Change to manufacturer. Also, this should be "shall" rather than "will"?	Correct typo	
DE		Annex A 7.13	Table	editorial	Why there is a cross in the row, if 7.14 is only for information?	Delete the cross and the min. of 3	
DE		Annex A 7.14	Table	editorial	Why there is a cross in the row, if it's only optional?	Delete the cross and the min. of 2	

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DE		Annex A 7.15	Table	editorial	Why there is a cross in the row, if it's only optional?	Delete the cross and the min. of 3	
DE		Annex A 7.5	Table	editorial	Delete the Row, because the test 7.7 is the same, but more critically test.	Delete the Row	
GB		Annex B		Te	Add the requirement for conductivity to product acceptance test	Add the requirement for conductivity to product acceptance test	
DE		Annex B 7.10	Table	editorial	With the Ultimate strength test it's possible to describe the behaviour of lengthening / shortening of the hose. If there are no differences, it is guaranteed that the behaviour of the hose is constant	Delete the cross and the min. 2	
DE		Annex B 7.5	Table	editorial	Delete the Row, because the test 7.7 is the same, but more critically test.	Delete the Row	
DE		Annex B 7.7	Table	editorial	With the Ultimate strength test it's possible to describe the behaviour of lengthening / shortening of the hose. If there are no differences here, it is guaranteed that the behaviour of the hose is constant	Delete the cross and the min. 2	
DE		Conclusion:			In regards to the comments, we are agreement with the standard.		

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