



ISO/TC 197
Hydrogen technologies

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ISO DIS 19880-2 Collated Comments 2017-09

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Expected action: INFO

Background: These are the collated comments from the DIS 19880-2 ballot 2017-09.

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

Template for comments and secretariat observations

Date:2017-09-23

Document: DIS 19880-2

Project: WG 19

MB/ NC ¹	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment ²	Comments	Proposed change	Observations of the secretariat
FR 1 001				Ge	French title is not good " Carburant d'hydrogène gazeux -- Stations-service -- Partie 2: Titre manque"	French title should be " Carburant d'hydrogène gazeux - Stations de recharge - Partie 2 : Dispositifs de distribution"	
FR 2 002				Ge	Completion and publication timing to be coordinated with ISO 19880-1 since ISO 19880-1 is a normative reference within ISO 19880-2, and ISO 19880-2 cannot be practiced without the essential information in ISO 19880-1.		
NL 003					It is not clear which functions of the dispenser need to be described in this document (for example with regard to a PLC or a 'slave' element), and thus unclear what requirements are applicable/needed in these standards, also considering that a lot of aspects are already covered (19880-1)	Clarify which functions of the dispenser are applicable, also in requirements (as long as these are not obsolete).	
US 0001 004		01	1	Te/Ed	Does not differentiate between a dispenser and a dispensing system	This standard provides the safety requirements and test methods for complete compressed hydrogen dispensing system dispensers with dispensing pressures up to the H70 pressure class designation. <u>The dispensing system may support multiple dispensers</u> . A typical hydrogen dispenser is illustrated in Figure 1 as installed and fueling a vehicle.	
US 0003 005		01	2	Ed	In the 2 nd paragraph there is a stray dash that should be deleted.	Additionally, not all equipment has to be physically housed within the enclosure at the dispensing area...	
US 004 006		01	3	Te/Ed	Does not differentiate between a dispenser and a dispensing system	This document provides the requirements for hydrogen <u>dispensing system</u> , dispenser(s) and requirements for hardware supporting the dispensing system such as valves and breakaways (19880-3), hoses (19880-5), nozzles (17268), and may provide specific references to other standards	

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						<p>for individual components included in the hydrogen dispenser such as valves</p> <p>(ISO 19880-3) and hoses (ISO 19880-3).</p>	
NZ 007		01	3	te	Standard for hoses is ISO 19880-5	Change 'hoses (19880-3)' to 'hoses (19880-5)'.	
DE 008		01 and 5.02	Figure 2 and a)	Te	In Figure 2 – example of a dispenser system the pressure sensor is located upstream of the filter. Requirement 5.2 a) states that the pressure shall be measured downstream of the filter.	Please correct figure 2 according to requirement 5.2 a).	
US 0002 009		01	Insert after 2	Ed	Does not differentiate between a dispenser and a dispensing system	<u>The dispensing system shall supply hydrogen at the temperatures, pressures and flows required by the dispenser. The system shall provide the communications means to the balance of the station to ensure safety and performance requirements of both the dispenser(s) and filling station are met.</u>	
GB 010		01	Para 3	Ed	Text beneath Figure 2 references ISO 19880-3 for hoses instead of 19880-5.	Change to: “.....standards for individual components included in the hydrogen dispenser such as valves (ISO 19880-3) and hoses (ISO 19880-5).”	
US 005 011		02		Te/Ed	ISO 19880-2 needs to be highly coordinated with DIS 19880-1 in the following ways: 1) Allows clear reference to normative requirements in ISO 19880-1 that are essential to practice of this standard. 2) Allows definitions of terms used in DIS 19880-1 to be shared without re-definition and reference to explanation of pressure terminology in Annex D of 19880-1.	<i>The U.S. recommends that the next ballot of ISO 19880-2 (whether DIS2 or FDIS) not be initiated until at least DIS 19880-1 starts ballot.</i> <i>Ideally, publication of two IS documents can be coordinated.</i>	
US 006 012		02		Ed	Several standards referenced in the draft document are not included in this Clause.	Add documents that are normative to this section and include others in the Bibliography: ISO/TR 15916, ISO 3601-1, ISO 3601-2, ISO 3601-	

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						3, ISO 4126, IEC 60079 (all parts), ISO 60529, ISO 14687, SAE J2600, SAE J2799 and UN GTR #13	
US 008 013		02		Te/Ed	Added the IEC enclosure references and refer to it.	IEC 60529 – Degrees of Protection provided by enclosures (IP code) .	
US 007 014		02	Footnotes	Ed	Footnote 4 should align with ISO 19880-6, not SAE J2601.	ISO 19880-6 ⁴⁾ , Gaseous hydrogen — Fueling stations — Part: 6 Fittings SAE J2601 ⁴⁾ , Fueling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles	Accepted
GB 015		02	List	Ed	Footnote number (4) is in wrong place	Move to ISO 19880-6	
GB 016		02	List	Ed	Why is SAE J2601 a normative reference? This is only referenced as an example of a protocol, or the source of a requirement,	Move to bibliography. Confirm if this needs to be a dated reference as not ISO/IEC.	
GB 017		02	List	Ed	Missing reference to SAE J2600	Add to Chapter 2. Confirm if this needs to be a dated reference as not ISO/IEC.	
FR 3 018		03		Te	Definitions to be harmonized with ISO 19880-1 general definitions.		
US 009 019		03		Te/Ed	Many definitions of this document are intended to be exactly the same as ISO 19880-1.	<i>Refer to 19880-1 as the source of basic definitions and then delete terms in this document that are in common with this document.</i> <i>Maintain only new terms as part of the definitions in Clause 3.</i>	
US 011 020		03.00 should be 3.9		Ed	Typo in numbering	Change "0" to "9"	

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GB 021		03.02	Para 1	Ge	The breakaway coupling, according to the ISO 19880-3 design requirements, only prevents release of high pressure hydrogen from the fuelling station. Also typo	Add text: “...shut off gas flow from the station in the event of a vehicle...”	
US 010 022		03.03	Note 2	Ed	Prior to 19880-1, insert ISO	Further guidance on dispenser pressure terminology and design rating is included in ISO 19880-1.	
GB 023		03.03	Para 1	Ed	Allowable and permissible mean same thing	Remove word “allowable”	
GB 024		03.05	Note 1	te	Inconsistent pressure units. It refers here to kg/m ² and later to pascals. Pick a pressure unit and use it throughout the document.	Consider the two pressure units (kg/m ² and Pa) and select one for use throughout the document.	
GB 025		03.09 (0)	number	Ed	typo	Should be 3.9	
US 012 026		03.10		Te/Ed	The definition of enclosure has been modified in response to CD2 ballot comments. Recommend using the new definition.	<i>Change definition of enclosure as follows:</i> structure, not a canopy, a protective housing, container, machine cabinet, etc. which encloses or partially encloses equipment of a station that may have access for maintenance but is not intended to be occupied Note 1: The use of an enclosure could be to protect equipment from the environment, provide noise attenuation, or provide safety to the areas surrounding the equipment <i>Retain other notes as numbers 2 and 3.</i>	

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US 013 027		03.15		Te/Ed	For consistency with preDIS19880-1 as discussed in 3.10 above, the housing should be "enclosure" and not a structure.	Change "structure" to "enclosure" in the definition.	
US 014 028		03.18	Note 2	Ed	Has the conversion of ISO/TR 19880-1 to an International Standard progressed to the DIS stage?	<i>Modify the note to read:</i> For further guidance on pressure terminology, refer to Annex D of ISO/TR 19880-1.	
US 015 029		03.19	Note 2	Ed	Has the conversion of ISO/TR 19880-1 to an International Standard progressed to the DIS stage?	For further guidance on pressure terminology and associated equipment ratings, refer to Annex D of ISO/TR 19880-1.	
JP 030 02		03.19	The 1st sentence	ed	There is a typing error at the end of the sentence. "°" meaning degree is abnormality.	To correct typing error to "15 °C".	
DE 031		03.21		Te	MAWP with 1,38 x NWP/HSL?	Why is the MAWP based on 1,38xNWP not 1,5xNWP like in the SAE J2600?	
US 016 032		03.21	Note 1	Ed	MOP and CHSS are used as acronyms however neither is defined or identified as Maximum Operating Pressure or Compressed Hydrogen Storage Systems.	<i>Add to definition of MOP:</i> maximum operating pressure MOP highest pressure that is expected for a component or system during normal operation Note 1: See ISO 19880-1 for discussion of pressure terminology and its application to dispenser system and filling stations, in general. <i>Change "CHSS" to "compressed Hydrogen Storage System (CHSS)".</i>	
US 017 033		03.21	Table 1	Te	ISO19880-1 is using 1.375xHSL (and not 1.38xHSL). Suggest harmonization. NOTE: Pressure values already appear to be	Change "1.38xHSL" to "1.375xHSL".	

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					calculated based on 1.375xHSL.		
JP 034 03		03.21	Table 1	ed	" 1.38 x HSL " in Table 1 isn't appropriate.	To correct to " 1.375 x HSL ".	
US 018 035		03.22	Note 1	Ed	There are also temperature-actuated safety relieve valves (TSVs) and pressure/temperature-actuated safety relieve valves (P/TSVs).	Note 1 to entry: Pressure actuated safety-relief valves are also known as pressure safety valves (PSVs) and pressure relief valves, but the latter term often leads to confusions with pressure regulating valves, which are abbreviated PRVs.	
DE 036		03.26	Eq. 1	Ed	Abbreviation for State of Charge is SoC and not SOX.	SoC(%)=...	
US 019 037		03.26	Note 1	Ed	SOX should be replaced with SOC	SOX SOC (%) = ...	
GB 038		03.26	Para 2	te	The text refers to g/L. The base SI format is kg/m ³ This is numerically the same.	Replace g/L with kg/m ³ .	
JP 039 04		03.26	The 1st sentence	ed	" ... to the density at the maximum operating pressure ... " isn't appropriate.	To correct to " ... to the density at the nominal working pressure ... "	
GB 040		03.27	All	Ge	Consider whether or not this is needed with the changes suggested for 5.5 and 6.2	Remove if not used in the document should these changes be made.	

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FR 4 041		04 8		Te	Inadequate electrical bonding and electrical grounding requirements.	To be improved based on information recently added to the post ISO 19880-1 CD2 draft.	
GB 042		04.01	(a)	Ge	The dispenser designer can only ensure this happens when the person integrating the dispenser into a system follows certain instructions.	Materials used shall be rated for the <u>limits of temperature and pressure to which they will be exposed under the conditions specified by the dispenser instructions.</u>	
GB 043		04.01	(d)	Ed	Typo	...”exposed <u>to</u> damp conditions...”	
GB 044		04.01	(g)	Ed	Typo	Remove ?	
US 020 045		04.01	b)	Te/Ed	Clarity	Use materials or coated materials that are sufficiently resistant to corrosion under the service condition. <u>Materials and coatings shall be adequate for the service conditions.</u>	
US 021 046		04.01	c)	Te/Ed	Clarity	For non-metal materials such as rubber or plastic, select those that are appropriate for the service condition so that no failure will occur during the expected service life. <u>Non-metallic materials used where environmental degradation is expected, shall be selected based on the service environment and for the duration of the expected service life.</u>	
US 023		04.01	c) & d)	Te/Ed	Clarity	Exchange text of 4.1.c) with 4.1.d)	

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047							
US 022 048		04.01	d)	Te/Ed	Clarity	<p>For metals to be used where risk of corrosion is high, including environments that are highly humid or regularly exposed damp conditions or salt spray, select those that are resistant to corrosion such as stainless steel, or coat the metals to make them highly resistant to corrosion.</p> <p><u>Metallic materials, used where environmental degradation is expected, shall be selected based on the service environment or shall be coated to be protected from this environment for the duration of the expected service life.</u></p>	
JP 049 05		04.01	detail g)	ed	There is an unnecessary abnormality letter between "avoiding the use" and "of materials" in detail g) .	To delete the unnecessary abnormality letter.	
US 024 050		04.01	e)	Te/Ed	Not sure what "For electrical insulation materials, use those that are sufficiently resistant to the temperature of the system parts they contact or are adjacent to with low moisture absorbance" means. Temperature addressed in 4.1.a)	<p>"For electrical insulation materials, use those that are sufficiently resistant to the temperature of the system parts they contact or are adjacent to with low moisture absorbance"</p> <p><u>"For electrical insulation materials, use materials appropriate for the application and environmental conditions such as temperature extremes and moisture.</u> those that are sufficiently resistant to the temperature of the system parts they contact or are adjacent to with low moisture absorbance</p>	
US 025 051		04.01	g)	Te/Ed	This is rather broad. More guidance is warranted.	<p>Select materials in accordance with local environmental requirements avoiding the use of materials that do not comply with these requirements such as: mercury, lead or asbestos. <u>As a minimum, avoid the materials specified in Directives 2002/95/EC and 2002/96/EC namely,</u></p> <ul style="list-style-type: none"> • <u>mercury,</u> • <u>lead,</u> • <u>cadmium,</u> • <u>hexavalent chromium,</u> • <u>polychlorinated biphenyls (PCB),</u> • <u>polychlorinated terphenyls (PCT),</u> • <u>chlorofluorocarbons (CFC),</u> 	

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						<ul style="list-style-type: none"> • <u>hydrochlorofluorocarbons (HCFC),</u> • <u>hydrofluorocarbons (HFC),</u> • <u>hydrocarbons (HC),</u> • <u>and components containing refractory ceramic fibres such as asbestos.</u> 	
DE 052		04.01	g)	Ed	...use ? of materials...	Delete question mark	
US 026 053		04.02.1	d)	Te/Ed	Convolutd. Attempt to clarify	<p><u>Components requiring scheduled servicing, adjustment or replacement shall be readily accessible to the service technician authorized by the manufacturer.</u></p> <p>All components that are routinely serviced shall be accessible for servicing and functional adjustment in position, and shall be replaceable during servicing</p>	
US 027 054		04.02.1	g)	Te/Ed	Many protection items are already addressed in 4.10 b). Refer to this section.	Dispensers shall be equipped with a means to secure and protect the fueling assembly. See 4.9 b) nozzle when not in use.	
US 028 055		04.02.1	h)	Te/Ed	As written, one could interpret that only one point in the temp/pressure matrix needs to be satisfied	Any component covered under this standard shall be capable of operating <u>over the entire in the</u> temperature and pressure range specified by the manufacturer.	
US 029 056		04.02.1	i)	Ed	Should the reference to 8.8 really be 8.9? (8.8 is vehicle dispenser interface test, while 8.9 is dispenser ground continuity test)	The dispenser shall be constructed so that the housing, frame and similar non-current carrying metal parts are electrically bonded to the point of connection of the equipment grounding means. See 8.8-8.9.	
JP		04.02.1	The 2nd	ed	"Any component covered under this standard shall	To correct to " Any component covered under this	

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057 06			sentence in detail h)		..." isn't appropriate.	document shall ...".	
DE 058		04.02.2		Ge	Inconsistent and very confusing use of terms. In the terms and definitions (chapter 3) only enclosure and housing is given. First sentence in chapter 4.2.2 deals with housings, enclosures and frames. Second sentence in chapter 4.2.2 deals with cabinets, enclosures and housings.	Please correct and be unambiguous in the use of terms.	
US 031 059		04.02.2	1 st paragraph	Ed	The terms "housing" is replacing should be separated in quotes. Only "housings" and "enclosures" are defined.	For simplicity and brevity, the term "housing" is used in place of " cabinets, enclosures, housings enclosures " and housings ".	
US 032 060		04.02.2	a)	Te/Ed	Multiple requirements are contained within this item. For clarity of requirements, the different requirements should be separated into different items.	<i>First requirement derived from item a:</i> <u>The housing shall be structurally adequate to protect the equipment contained within from the elements while protecting the operator and the general public from the equipment within.</u> made of suitable materials and finished with appropriated coatings.	
US 033 061		04.02.2	a)	Te/Ed	Continuation of U.S. comment to 4.2.2 a) above.	<i>Second requirement derived from item a as 2nd paragraph:</i> The housing shall be durable, and facilitate normal operation of the device <u>and retain its aesthetics (e.g. not oxidize, craze, fade, etc).</u>	
US 034 062		04.02.2	a)	Te/Ed	Continuation of U.S. comment to 4.2.2 a) above.	<i>Third requirement derived from item a as 3rd paragraph:</i> <u>It shall be demonstrated that the housing meets or exceed the requirements of IEC 60529 (IP code). The IP requirements are to be stipulated by the manufacturer.</u>	
US 035		04.02.2	a)	Te/Ed	Continuation of U.S. comment to 4.2.2 a) above.	<i>Fourth requirement derived from item a as 4th paragraph:</i>	

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063						<u>It shall be demonstrated that a A</u> recess or depression in the housing that may collect water shall incorporate a means to drain the water to a <u>safe an appropriate</u> location.	
US 036 064		04.02.2	c)	Te/Ed	Multiple requirements are contained within this item. For clarity of requirements, the different requirements should be separated into different items.	<u>Move the 3rd sentence into a separate requirement item.</u>	
US 037 065		04.02.2	d)	Te/Ed	The choice of natural or forced ventilation is the manufacturer's choice. Possibility of needing ventilation to provide cooling should also be addressed.	<i>Insert the following sentence at the beginning of the paragraph:</i> <u>To prevent the accumulation of hydrogen and possibly manage heat build-up, the enclosure containing fuel bearing component shall be adequately ventilated.</u> the enclosure which houses gas-carrying components shall incorporate vent opening(s) near the top and bottom. These openings shall be of such size and arrangement as to prevent the accumulation of hydrogen within the housing.	
DE 066		04.02.2	d)	Te	Should the accumulation of hydrogen gas generally be avoided or should flammable/combustible hydrogen air mixtures be avoided?	Please clarify	
US 039 067		04.02.2	Last line	Te/Ed	Requirement needs a number.	<u>h)</u> The protective housing of a dispenser shall be made of non-combustible and anti-static materials.	
US 038		04.02.2	new item	Te/Ed	Additional requirement should be considered.	g) Plastic parts used for viewing panels shall be resistant to deterioration of transparency from	

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068						conditions imposed on them in service.	
GB 069		04.02.2 (also Note 1 of 3.15)	Para 1	Te	<p>Frames are not housings. There may be a frame supporting the housing (or enclosure), but they are not equivalent.</p> <p>If the issue relates to the issues of equipment (hydrogen containing, or electrical etc) inside an enclosure (for example (c), (d) and (e)), then these should be a housing/enclosure/cabinet specific section.</p> <p>However, if an open frame dispenser is envisaged, that the public can access equipment, or potentially with a mesh to prevent tampering, then some elements of (a) and (b) could be applicable....</p>	<p>Consider referencing the enclosures section of ISO 19880-1, which should cover many of the requirements for dispenser housings.</p> <p>Consider whether frame is an appropriate word to include.</p> <p>Maybe replacing frame with cabinet in the first sentence would be better?</p> <p>Consider if this needs separating into sections to cover frames as well as housings.</p>	
GB 070		04.02.2	Para 5	Te	<p>"The assembled system shall be cleaned in accordance with recognized industry practice so as not to affect fuel quality as established in ISO 14687-2"</p> <p>Please clarify what recognised industry practice is for this?</p> <p>Is it implying air and moisture must be removed from the assembled system prior to shipping?</p>	Please consider and clarify what the requirement is here.	
GB 071		04.02.2	Para 7	Te	<p>Is there an upper limit for the resistance?</p> <p>For the dispenser once installed this is in ISO 19880-1 (although still under discussion)</p>	Please add a value to be tested against.	
JP 072 07		04.02.2	The last sentence	ed	The last sentence in 4.2.2, " The protective housing of a dispenser shall ...", is a latter part of detail f) .	To close up the space between the first sentence and the next sentence in detail f).	
US 030		04.02.2	Title	Te/Ed	Since the "housing" is intended to include "enclosures, at least the title should reflect this.	Change the title to "Housing and enclosures"	

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073							
GB 074		04.03	Bullet 1		ISO 19880-1 is now being more accurate about the %age being 10% above 125% HSL – i.e. 137.5 % HSL	Change to 137.5 %	
GB 075		04.03	Bullet 2	Te	Confusing requirements. What is the required range of ambient temperatures for an ISO type approved dispenser? Is it completely up to the manufacturer?	Separate the overall dispenser requirement from the hydrogen bearing component requirements, and move to a more appropriate place in the document (4.2?) Clarify the requirement for the dispenser ambient temperature rating. Please take into account that IEC standard ambient conditions according to IEC 60079-0 are -20 to +60 deg C (or possibly +40 deg C), and a requirement outside of this may invalidate the appropriateness of standard components for use.	
JP 076 08		04.03	The 1st detail under the third sentence	ed	" ... greater than 138 % of ..." isn't appropriate.	To correct to " ... greater than 137.5 % of ...".	
US 040 077		04.04	a)	Te/Ed	Testing is a last resort. A proprietary part (compression fitting design with millions of hours of successful service) or a commodity (listed in the piping code) have been used with hydrogen for decades and do not require additional testing. A proprietary fitting with limited or no service history will require testing, hence CSA HGV 4.10 and ISO 19880-6.	All fittings and end connections shall be verified suitable for use with compressed hydrogen gas. Suitability can be determined by test (ISO 19880-6), acceptance by code or by field history-complying with the applicable tests specified by- The testing specified in ISO 19880-6 may be waived when evidence exists that the fittings or connections are acceptable for service in accordance with ISO 15649 (or selected piping standard(s) in ISO 19880-6) <u>or extensive field service (e.g. compression fittings)..</u>	
GB 078		04.04	b	Ed	Typo	Component <u>pressure</u> ratings shall...	

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US 041 079		04.04	e)	Te/Ed	See 4.4 d)	Where used, tube fittings shall be chemically compatible with associated components, and shall be designed to resist electrolytic action.	
US 042 080		04.04	f)	Te/Ed	See 4.4 d) Clarification of process.	Cut ends and drilled holes in piping <u>Ends of piping and tubing</u> and tubing shall be carefully <u>deburred</u> . <u>Deburring is the process where metal chips formed during the cutting or machining process are mechanically removed.</u> machined to remove defects that could cause particulate contamination.	
DE 081		04.04	g)	Ed	No line break between number and unit	Please correct	
US 044 082		04.04	Last para.	Te/Ed	Requirements in the paragraph should be included on the lettered list.	j) The use of tapered threaded components shall be minimized <u>as much as possible. Close pipe nipples shall not be used.</u> k) Close pipe nipples <u>are prohibited shall not be used.</u>	
US 043 083		04.04	new	Te/Ed	Add a new requirement.	i) Fittings shall be suitable for the pressure class and temperature rating of the dispenser.	
GB 084		04.05	(a)		ISO 19880-1 is now being more accurate about the %age being 10% above 125% HSL – i.e. 137.5 % HSL	Change to 137.5 % Change example to 96.25 Mpa	

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GB 085		04.05	All	Ge	Is there a reason for not referencing ISO 19880-3?	Consider whether this should be a requirement or recommendation in addition to requiring compliance with ISO 4126.	
US 046 086		04.05	Last para	Te	Should be an item on the list.	The discharge piping system from a PSV shall not restrict flow and shall be vented to an acceptable location per ISO 156449 and national/regional regulation. See ISO 19880-1 for additional guidance.	
GB 087		04.05	Para 2	Ed	Typo	"...lowest rated...", not "...lower rated..."	
JP 088 09		04.05	The 2nd sentence in detail a)	ed	" ... MAWP which corresponds to 138 % of HSL ..." isn't appropriate.	To correct to " ... MAWP which corresponds to 137.5 % of HSL	
JP 089 10		04.05	The last sentence in detail a)	ed	The last word, 96.6 MPa, in the last sentence isn't appropriate.	To correct to 96.25 MPa .	
US 045 090		04.05 a)		Te/Ed	Break in to additional paragraphs to clarify requirements and correct the setpoint. Consider possibility of multiple dispenser levels from a single dispenser system.	A pressure safety relief valve (PSV) on the dispensing line or hydrogen supply to dispenser shall protect against over-pressurization of the e-Components and piping in the dispensing system and the vehicle being fueled shall be protected against over-pressurization. Pressure protection can be provided by a pressure safety-relief valve (PSV) on the dispensing line or hydrogen supply to dispenser. As an alternative, an	

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						<p>equivalent SIL-rated control may be used when allowed by local/national regulation.</p> <p>The set point for a dispenser PSV shall be no higher than the MAWP which corresponds to 138 137.5% of HSL as defined in Table 1. For example, for 70 MPa HSL fueling (the H70 pressure class), the PSV may be set at as high as 96.6 MPa.</p> <p>If any components in the dispenser system are rated below the pressure in 4.3, then the setpoint of the dispenser PSV shall be lowered to protect the lowest-rated component in the dispenser system.</p> <p>If a dispenser system is designed to dispense fuel at more than one Hydrogen Service Level (HSL), then pressure protection is required to protect dispenser components that are unique to a particular HSL including the fuel assembly and the vehicle at each HSL. The setpoint for each HSL may be up to 1.375xHSL as defined above.</p> <p>An equivalent SIL-rated control can be used instead of PSV. See ISO 19880-1 for guidance.</p>	
US 047		04.06		Te/Ed	Modify lead sentence slightly.	<u>Filters and other clean-up devices shall meet the following requirements.</u>	

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091							
GB 092		04.06	All	Ge	Is there a requirement for the dispenser to include a filter? B & D imply this, but it isn't stated	Clarify what must be included in a dispenser. PRVs seem not to be required – presumably on the condition that instruction is provided that a PRV set at a maximum XXX pressure is installed upstream of the dispenser? Maybe a general section should lay down what is required in a dispenser, and the conditions where this is not the case?	
DE 093		04.06	b) and c)	Ge	c) and d) have the same meaning. Please summarize.	b) Adequate means shall be provided to protect both the vehicle and the dispenser from gas, liquid and solid contaminants to avoid contamination, clogging, and erosion of hydrogen system components. The dispenser shall be designed to deliver fuel with the gas composition specified by ISO 14687-2.	
DE 094		04.06	g)	Ge	Hydrogen fuel quality control is defined in ISO 19880-8.	Please add reference to ISO 19880-8.	
GB 095		04.06 (b)	Para 1	Te	Can a filter in the dispenser prevent these things happening? Also, the filter in the dispenser cannot prevent contaminants reaching the dispenser.	Remove requirement for the dispenser to protect the dispenser. Consider whether it is appropriate to have “The dispenser filter have a requirement to protect the vehicle from gas, liquid and solid contaminants irrespective of the quality of hydrogen going into the dispenser. Isn't it more likely that the filter is only there to remove particulates? If the filter is not included in the dispenser, then direction should be given to the integrator to place the filter upstream of the dispenser.	
GB		04.06 (g)	Para 1	Te	It would be impossible to have an ISO 19880-2 compliant dispenser if it requires knowing, and	Replace with just:	

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096					assessing, all of the possible future fuelling station operators' maintenance and inspection plans. Remove this requirement.	"The dispenser supplier shall provide a maintenance and inspection plan for the filters." However, additionally, consider if this is the correct location for this requirement, or if it is a general requirement for the whole dispenser, and should be located in "Product Literature" (i.e. 10.3).	
US 048 097		04.06 b)		Te/Ed	This is the basic requirement and therefore should be item a.	Switch items a) and b).	
US 049 098		04.06 c)		Te/Ed	The second sentence belongs with item d).	<u>Move the second sentence in c) to be the first sentence in d).</u>	
US 050 099		04.06 d)	Bullet 1	Te/Ed	Provide a more performance-based statement of the requirement.	<i>Modify the 2nd as follows:</i> The fuel delivered to the vehicle shall be <u>equivalent to hydrogen</u> processed with a filter rated at no greater than 5 µm (micron) nominal (i.e. 99% efficiency) particle size..	
NZ 100		04.06 f)	1	ed	The term 'dispensing device' is not defined.	Replace with 'dispenser'.	
US 051 101		04.07	1	Te/Ed	Separated requirements for clarity.	Valves used in piping systems for gaseous hydrogen shall be designed in accordance with ISO 15649 <u>or national/regional regulation and be shown to be suitable for use with compressed hydrogen gas.</u> <u>Suitability can be determined by test (ISO 19880-3), acceptance by piping code, or by field history.</u> <u>and meet ISO 19880-3. The testing specified in ISO</u>	

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						19880-3 may be waived when sufficient evidence exists that the valve is acceptable for service in accordance with ISO 15649 (or selected piping standard per item a of 4.4).	
US 052 102		04.07	2	Te/Ed	Missing requirement	Component ratings of dispenser valves shall meet or exceed the dispenser system MAWP <u>and operating temperature range</u> . See Table 1, 4.3 and 4.4.	
US 053 103		04.08	a)	Te	What does safe mean? It is a subjective term.	A dispenser shall be equipped with means for venting the release of hydrogen gas to a <u>safe appropriate</u> location or captive system. See ISO 19880-1 for guidance.	
US 054 104		04.09	b)	Te/Ed	Expand requirements and re-format.	<p><i>Insert as first paragraph in b);</i></p> <p>Dispensers shall be equipped with a means to secure and protect the fueling hose and nozzle from damage when not in use and keep the nozzle sealing surfaces clean.</p> <p><i>Break-up paragraphs in current version of b):</i></p> <p>The fueling assembly shall be supported so that the hose does not touch the ground during normal operation.</p> <p>The fueling nozzle should also be securely supported and protected from the accumulation of foreign matter (e.g. snow, ice or sand) that could impede operation.</p> <p>The device supporting the hose should be designed to ensure it does not cause misalignment when attaching the nozzle to the vehicle receptacle. Where hoses are attached to a hose retrieving mechanism, the breakaway device shall be installed between the point of attachment of the</p>	

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						hose retrieving mechanism to the hose and the nozzle, unless the retrieving mechanism separates from the hose at a force less than that of the breakaway device, has no impact on the operation of the hose breakaway feature and does not result in damage to the dispenser frame.	
US 055 105		04.09	c)	Te/Ed	Develop new subsection for breakaways.	Insert 4.9.1 Breakaway Devices and include the text of item c as the content of the new section.	
US 056 106		04.09	d)	Te/Ed	Develop new subsection for breakaways.	Insert 4.9.2 Hose assemblies and include the text of item d as the content of the new section.	
US 060 107		04.09	e)	Te/Ed	Define new subclause for nozzles.	Insert 4.9.3, Nozzles, and include the text of item e as the content of the new subclause.	
US 061 108		04.09	f)	Te/Ed	This is a fuel assembly requirement.	Move up to after Item b under fueling assembly.	
US 062 109		04.09	Last para	Te/Ed	This is a basic fuel assembly requirement.	Move up to Item a under fueling assembly.	
US		04.09	new	Te	The breakaway may be placed between a short	<i>Include in 4.9.2:</i>	

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058 110					hose assembly (0.5m) and a standard assembly (3 m) as is done with petroleum hoses to ensure that the major load on the breakaway is axial.	<u>If a short hose assembly is required up stream of the breakaway for system flexibility; the short hose assembly shall not exceed 0.5 meters in length.</u>	
US 059 111		04.09	new	Te	The threads should not unscrew without a conscious effort by an authorized technician.	<i>Include in 4.9.2:</i> <u>All threaded connections of the dispenser hose assembly shall have provisions to prevent the loosening of the threaded joint.</u>	
GB 112		04.09 (b)	Para 1	Te	Is all or part of this referring to when the dispenser is not in operation? Is the intention to prevent the hose from driven over when the nozzle is hang up, in which case, is touching the ground in an area where vehicles cannot drive sufficient?	Separate into section for when stored, and when in use. Consider if the hose not touching the ground under all conditions is necessary.	
GB 113		04.09 (c)	Para 1	ge	The breakaway coupling, according to the ISO 19880-3 design requirements, only prevents release of high pressure hydrogen from the fuelling station.	Change to: "A breakaway coupling shall be provided as part of the fueling assembly to stop the release high pressure hydrogen <u>from the dispenser</u> in the event of a drive-away...."	
GB 114		04.09 (c)	Para 2	ge	Some damage to the dispenser housing/cabinet can be acceptable during break away release. This should be an operator choice	Change to: "The hose breakaway device shall be positioned such that when the fueling hose is pulled along its axis, it will release without <u>significant</u> damage to the dispenser cabinet....."	
GB 115		04.09 (c)	Para 2	ge	The nozzle and fueling hose assembly (and venting hose assembly where appropriate) will (hopefully) be attached to the vehicle in the event of a breakaway being deployed. It is difficult for the dispenser designer to stop these components being damaged whilst being dragged behind a vehicle...	Consider if this is appropriate. Maybe it would be better to design to minimise (significant) damage to the components remaining in the fuelling station only?	
US 064		04.10	2 nd para of a)	Te/Ed	Separate info in the 2 nd paragraph from item a).	Move the 2 nd paragraph to a separate item letter, i.e., 4.10 b).	

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116							
US 063 117		04.10	a)	Te/Ed	Expand discussion of rating and re-word.	Instruments shall be rated for service <u>for the fluid it is exposed to in the hydrogen system</u> . Specifically, the pressure/ temperature ratings and material compatibility bearing housings of instruments in gaseous hydrogen system shall be consistent for use in the piping system (as described in 4.4).	
US 065 118		04.10	d)	Te/Ed	Hydrogen might not be the only flammable. For example, what is the precooling fluid?	Housings for hydrogen control equipment should be designed to prevent any accumulation of hydrogen or other <u>flammable hydrogen</u> gases.	
JP 119 11		04.10	detail e)	ed	There is an unnecessary underline at "(hose)" in detail e).	To erase the unnecessary underline at "(hose)".	
US 066 120		04.10 f)		Te/Ed	Expend requirements to cover all types of measurement devices.	All pressure gauges <u>and transducers</u> exposed to compressed hydrogen gas shall be suitable for use <u>with it at over</u> the <u>full</u> operating pressure and temperature range. <u>All transducer readouts shall be a minimum of 12 mm in height.</u> The gauge shall read at least 1.2 times the maximum allowable working pressure of the system for which it is used, and shall have a dial face at least 63 mm in diameter and an orifice no greater than 1.4 mm in diameter . Pressure gauges in a dispenser shall be of a safe construction in the case with a relief function. <u>All pressure instruments shall</u> have a snubber (orifice) which does not exceed 1.4 mm in diameter.	

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US 067 121		04.11		Ed	Each requirement should be numbered.	Number as <u>4.11 d)</u> Flow meters shall be consistent with the electrical area classification and service conditions of high pressure hydrogen dispensing sensors and shall comply with applicable provisions of ISO 15649 and IEC 60079.	
JP 122 12		04.11	detail c)	te	A definition of flowmeter housing is unclear in detail c) of 4.11. For example, a case of CORIOLIS type flowmeter isn't a pressure resistant material, in general. However, it is too strict to demand such flowmeter case complies with ISO 15649.	To delete detail c) in 4.11 if the definition of flowmeter housing contains a case of CORIOLIS type flowmeter.	
GB 123		04.11 (a)		te	"flow metering device" is too specific. Suggest to expand to "device or system".	Add text: "...flow metering device <u>or system</u> connected to a readout giving the quantity of hydrogen dispensed for each vehicle fueling operation...."	
JP 124 13		04.12	The 1st sentence	ed	Letter " ° " meaning degree is missing at " -40C" in the first sentence in Clause 4.12.	To correct it to " - 40 °C".	
US 068 125		04.13.03		Te	The latest draft of preDIS 19880-1 has following key paragraphs in Section 11.1.	<u>Consider replacement of the text with the following:</u> <u>Electrical control systems, components of hydrogen fueling stations, and devices determined by the manufacturer to be safety related control systems, shall comply with the requirements of IEC 60204-1 or equivalent regional standards.</u> <u>The risk assessment in 6.1 shall determine what to do when there is a system fault on the process control or safety system.</u> <u>Where the manufacturer's risk assessment requires a response to abnormal states (faults) with an increased reliability to that achievable from the control system, the fueling station shall be equipped</u>	

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						<p><u>with an additional safety system or layer of protection. IEC 61508 and IEC 61511 could be used for specification, design, testing, operation and maintenance of such a safety system.</u></p> <p><u>The safety system could be composed of several safety functions activated manually or automatically.</u></p> <p><u>The configurations of process control and safety systems shall be documented. See ISO 19880-1 for guidance.</u></p>	
DE 126		04.13.03		Ed	Crossed out words should be deleted.	Please delete crossed out words	
NZ 127		04.13.03	1	te	Clause 6.1, not 5.1, specifies the risk assessment.	Amend reference '5.1' to '6.1'.	
NZ 128		04.13.03	4	te	Agree investigation should not be restricted to specified functions only.	Delete struck out text.	
JP 129 14		04.13.03	The last sentence	ed	There are two unnecessary strikethroughs in the last sentence.	To erase these two strikethrough words, "its" and "specified".	
US 069 130		04.13.04	new	Te/Ed	Insert a new subclause - lighting	<p><u>4.13.4, Illumination</u></p> <p><u>Illumination techniques shall conform to the area or zonal classification of the dispenser. Refer to IEC 60079.</u></p> <p><u>Illumination hardware shall be installed per the manufacturer's instruction and conform to IEC</u></p>	

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US 070 131		04.13.05	new	Te/Ed	New section – Point of sale equipment	<p><u>60204.</u></p> <p><u>4.13.5, Point of Sale equipment</u></p> <p><u>Equipment shall conform to the area or zonal classification of the dispenser. Refer to IEC 60079.</u></p> <p><u>Hardware shall be installed per the manufacturer's instruction and conform to IEC 60204.</u></p>	
US 072 132		04.14		Te/Ed	Suggest that you consider latest wording in 8.2.2.2 of ISO 19880-1 as modified for insertion in 4.14.	<p><i>Replace text with the following:</i></p> <p>The dispenser shall operate in conjunction with an emergency shutdown function, which may be automatically activated by the dispenser control system or manually activated. See ISO19880-1 for guidance in establishing automatic actions based on the risk assessment in 6.1 and for provisions required for manual ESD connection and for coordination with the filling station control. The emergency shutdown function shall be operational at all times and override all other functions and operations in all operating modes of the dispenser.</p> <p>Activation of the emergency shutdown shall cut off the flow of hydrogen gas to the dispenser and vehicle which initiated the shutdown by closing the automatic isolation valves defined in 8.3.2.2.1. Other emergency shutdown functions that may need to be considered in the risk assessment include:</p> <ul style="list-style-type: none"> • vent any remaining gas in the dispenser lines to a safe location; • shut down the upstream compression systems where these compress hydrogen directly to the dispenser; • removal of power to non-classified electrical components in the vicinity of the dispenser. <p>NOTE Other emergency stop functions may need to be considered to leave the dispenser in a safe state.</p> <p>Operation of the dispenser shall require a manual reset after the emergency shutdown is tripped.</p>	

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						Recommended selection, placement, and connection of the ESD buttons shall be defined in the manufacturer's documentation. See ISO19880-1 for guidance. An emergency stop device shall be provided in the vicinity of the dispenser, but sufficiently separated from the dispensing area such that it can be safely actuated under fault conditions without entering a potentially hazardous area.	
US 073 133		05.01	Last sentence	Te/Ed	All requirements should be numbered and clear.	Label the last sentence as item d) and indent.	
GB 134		05.01 (c)		te	It is still not clear what "activated" means. For some manufacturers, the proximity sensor on the nozzle housing needs to be pressed down (i.e. nozzle needs to be on the dispenser) in order to "activate" the dispenser (i.e. enable it for refuelling). Then once the nozzle is on the vehicle, a button can be pressed to start the fuelling process. The requirement "Nozzles shall be positioned such that removal from their mounting is required before the dispenser can be activated" would not be met, however there is no reason for this to be prohibited.	Rewrite, as an example: The fuelling process shall involve at least two steps to initiate hydrogen flow to the vehicle: i) Removing the nozzle from the mounting and connecting it onto the vehicle receptacle (with instruction to the operator to ensure that the nozzle is correctly locked on to the vehicle receptacle) ii) Commencing the automated fuelling process by a second action, for example, pressing a button or through a human-machine interface (HMI)	
NZ 135		05.01 c)	1	te	The final sentence 'Once connected to the vehicle, the user may initiate fueling.' is an outcome, not a requirement.	Rewrite, as item d): The user may only initiate fueling once the nozzle is properly connected and locked to the vehicle.	
US 074 136		05.02		Ed	The temperature reference is an unusual degree symbol. This symbol is not included with the temperature unit (C).	The accuracy of the ambient and fuel delivery temperature sensors shall be within +/- 2°C 2°C .	
US		05.02		Te	Provide guidance on the location of the flow	<i>Insert the following sentence as the last sentence:</i>	

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075 137					sensor.	<u>Flow measurement shall be at the location in the dispensing system that yields the greatest accuracy.</u>	
JP 138 15		05.02	NOTE	ed	There is a typing error at "pressor" in NOTE.	To correct to " pressure ".	
JP 139 16		05.02	The 3rd sentence from the last sentence	ed	There is a typing error at the end of the 3rd sentence from the last sentence "°" meaning degree is abnormality.	To correct typing error to "+/- 2 °C".	
US 076 140		05.03		Te/Ed	Improve clarity of the phrase.	Additional high pressure integrity checks during and/or after fueling should be used until such time the dispenser components have a demonstrated history of success <u>generated satisfactory field data history</u>	
US 077 141		05.04		Te/Ed	Clarity of phrase	While inactive, a dispenser hose shall be maintained at pressurized to a pressure greater than atmospheric pressure.	
US 078 142		05.04			Clarity of phrase	The <u>dispenser</u> fueling assembly shall be designed to ensure that air does not enter the assembly <u>when installed.</u> cannot enter it when the nozzle is removed from the receptacle.	
NZ 143		05.04	1	te	It is undesirable for the hose to remain fully pressurised.	"...shall be <u>depressurized</u> to a pressure greater than ...".	

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GB 144		05.04	Para 1	Te	Presumably this means that the whole dispenser system should be held above atmospheric pressure? No lower limit is given. For type C nozzles, these must be depressurised to <0.5 MPa. Is this allowing a pressure slightly above atmospheric, for example, the cracking pressure of a check valve?	Please clarify lower limit, for instance as a minimum pressure above atmospheric pressure	
GB 145		05.04	Para 2	Te	It is not clear how the design of the hose assembly (flexible hose and a fitting at each end) can have any influence over this. If this is achieved by using an ISO 17268 or SAE J2600 nozzle, presumably this is satisfied? If that is the case, you have a requirement for nozzles meeting these standards anyway, so this is unnecessary.	Remove.	
NZ 146		05.05	1	te	Filling protocols should limit the fill pressure to minimise the risk that if a vehicle is parked in hot conditions (eg in direct sunlight) the rise in ambient temperature the pressure developed in the vehicle fuel system will increase beyond its maximum allowable operating pressure.	Add a suitable note.	
GB 147		05.05	All	Ge	This takes a number of concepts covered in ISO 19880-1, but doesn't appear to develop them. The last 2 paragraphs, regarding emergency isolation valves between the storage and the dispenser, are likely outside the scope of a stand-alone dispenser.	Include first two sentences (slightly simplified), and remove anything else that isn't a requirement for a type approved standalone dispenser, that wouldn't otherwise be necessary. Suggested text simply: "Dispensers shall be equipped with a control system that utilises a fuelling protocol to control the fuelling process. The fuelling protocol shall fulfil the requirements of ISO 19880-1." Consider introducing the concept that the fuelling protocol needs to be able to be achieved with hydrogen supplied to the dispenser as per the	

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						dispenser designer's instructions – temperature, pressures, flow, etc under the ambient temperatures etc stated by the dispenser designer.	
US 081 148		05.05	Para 10	TE	Considerable work has been done by industry stakeholders in WG24 to develop consensus language around fueling protocols. Having conflicting or different requirements is confusing. 19880-2 should simply reference 19880-1. 19880-1 has much more detailed information on validation testing. Delete and reference 19880-1. A vehicle should NOT be required as a test device.	The performance of the dispenser and its ability to perform the fueling protocol in full compliance shall be verified by a hydrogen dispenser test apparatus as defined by Annex B of ISO DTR the requirements in 19880-1 or representative vehicle.	
US 082 149		05.05	Para 11-12	TE	Considerable work has been done by industry stakeholders in WG24 to develop consensus language around fueling protocols. Having conflicting or different requirements is confusing. 19880-2 should simply reference 19880-1. The isolation valve may or may not be part of the dispenser. There are detailed requirements on the isolation valve in 19880-1. Simply reference.	The isolation valve(s) used for flow control shall meet the requirements in 19880-1 to shut-off hydrogen flow to the dispenser shall not be used for process control. Separate control valve(s) shall be used for process control of the fueling protocol. Subject to the filling station design, <u>a</u> second isolation valve may be required per ISO 19880-1 to automatically shut-off in the station at the inlet of the hydrogen line to the dispenser, this possibility shall be accommodated in the dispenser control. Separate control valve(s) shall be used for process control of the fueling protocol.	
US 079 150		05.05	Para 1-6	TE	Considerable work has been done by industry stakeholders in WG24 to develop consensus language around fueling protocols. Having conflicting or different requirements is confusing. 19880-2 should simply reference 19880-1.	Dispensers shall be equipped with a control system that utilizes a fueling protocol to control the fueling process and calculate fueling targets for each fueling event such that the vehicle is properly filled. The fueling protocol shall meet the requirements in ISO 19880-1. The use of an approved published fueling protocol developed by a recognized standards development organization (SDO) such as SAE J2601 is recommended for dispensers open to the public. NOTE 1 Using a consensus standard for public stations ensures that the protocol is acceptable for fueling a broad range of vehicle: for example, vehicles compliant to GTR #13. NOTE 2 Use of alternative protocols may be	

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						<p>acceptable in private settings where the type of CHSS in the vehicle allows limits that are not generally acceptable for public applications; for example, private fleets that only fuel CHSSs with Type 1 tanks.</p> <p>NOTE 3 The use of non-standard and ambient temperature protocols could cause issues with the vehicle and the requirements for their use are listed in ISO 19880-1.</p> <p>The fueling protocol shall consider the full range of possible ambient temperature and vehicle operating conditions and vehicle tank capacity. See ISO 19880-1 for selection and use of particular protocols.</p>	
US 080 151		05.05	Para 8&9	TE	<p>Considerable work has been done by industry stakeholders in WG24 to develop consensus language around fueling protocols. Having conflicting or different requirements is confusing. 19880-2 should simply reference 19880-1.</p> <p>Discussion on toptoff is confusing because it is not clearly described. Just reference 19880-1.</p>	<p>The station dispenser shall not start fueling or shall terminate the fueling within 5 seconds if any of the following fueling protocol limits defined in ISO 19880-1 are exceeded during fueling. Deviations from these limits shall also be considered as part of the risk assessment in 6.1. Additional countermeasures may be required to prevent these limits from being exceeded.</p> <p>The dispenser shall perform top-off fueling of vehicles only when this is allowed by the fueling protocol. See ISO 19880-1.</p>	
JP 152 17		05.05	The last sentence	ed	There is a typing error at "filling" in the 1st part of the sentence.	To correct to " fueling ".	
NZ 153		05.05 Note 1	1	ed	No reference to GTR #13.	Add reference.	
DE 154	1	06.01		Ed	Delete double word ISO	Please correct	

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DE 155	4	06.01		Ed	Delete dash between process-and	Please correct	
US 083 156		06.01	2 nd paragraph	Ed	There is a stray dash between process and execute that needs to be deleted. The clause should be expanded to capture the basic dispenser control fault management requirement.	The dispensing control system shall monitor for faults during the fueling process and execute countermeasures to mitigate the hazard when a process deviation that could result in a hazardous condition is detected or activate an automatic Emergency Shutdown System (ESS) (see 4.14). See 4.14 and ISO 19880-1.	
JP 157 18		06.01	The 2nd sentence	ed	" ISO ISO 19880-1 " at the front of the 2nd sentence is typo error.	To delete the unnecessary "ISO" of the first one.	
US 084 158		06.02	All	TE	Considerable work has been done by industry stakeholders in WG24 to develop consensus language around communications protocols. Having conflicting or different requirements is confusing. 19880-2 should simply reference 19880-1.	6.2 Vehicle-to-dispenser communication 6.2.1 General If the fueling protocol uses communication of the tank temperature on the vehicle and experiences a failure of the communication, the protocol shall meet the requirements in 19880-1 terminate the fueling event or shall switch to a non-communication fueling when this is allowed by the protocol. 6.2.2 IRDA If the vehicle uses an IRDA communication method to transmit information to the dispenser, the data language shall use a format such as what is described in SAE J2799, and shall: Terminate fueling events if an ABORT signal is seen as "sent from the vehicle"; and, Evaluate that the tank temperature data is valid before taking credit for the tank temperature in calculation of the final target pressure	

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GB 159		06.02	All	Te	This includes similar, but less refined requirements than ISO 19880-1. If a station with an ISO 19880-2 compliant dispenser is assessed against ISO 19880-1, it needs to be able to pass....	Suggest that this just points to ISO 19880-1, unless anything new is being added above the requirements of ISO 19880-1, see 8.2.1.3 of the current draft ISO TC 197 WG24 N429	
NZ 160		06.02.2	1	ed	IRDA is not defined.	Provide a definition.	
NZ 161		06.02.2	1	ed	SAE J2799 is not included in the bibliography.	Include a reference.	
DE 162		06.02.2.		Te	How is the temperature verified?	More detailed instructions needed	
US 085 163		07.02		Ed	With regard to the markings, it is acceptable to have any Class III A marking (i.e. Class III A1 or III A2)?	Clarify, if necessary.	
US 086 164		07.03		Ed	With regard to the markings, is it acceptable to have any Class III marking (i.e. Class III A1, III A2, III B or III C)?	Clarify, if necessary.	
US 088 165		07.03	New	Te/Ed	Clarify text.	b) Symbols shall comply with the ISO 3864-2 or as specified in the local/state regulations.	
US 087 166		07.03	Para 1	TE	Because public stations can be used by anyone, including untrained users, it is important to require simple instructions.	Dispensers intended for self-serve operation shall bear, on a Class III marking, operation instructions. These instructions shall be easily read when the dispenser is in a normally installed position. <u>The</u>	

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						<u>instructions shall be understandable by an untrained, public user</u> in the region of use.	
GB 167		07.03	Para 1	Te	It is important to ensure that operating instructions are clearly visible and do not fall off, but restricting the method to Class III markings is too limiting. New dispensers such as that which Shell is developing with partners (see photos at end of comment sheet) will have the instructions on a large screen which is required to be functional for the dispenser to work and will guide the user through the refuelling process. As it is screen based, there is no chance for the instructions to 'fall off.	Change to: "Dispensers intended for self-serve operation shall bear operation instructions which shall be easily read when the dispenser is in a normally installed position. Such instructions may be displayed via a Class III marking, operation screen or other method similarly resilient to removal."	

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US 089 168		07.04		Ed	Per ISO19880-1, fueling station equipment assembly markings and warning signs should comply with the applicable clauses of ISO 7010, ISO 3864, ISO 17398 and IEC 60417.	7.4 Filter replacement warnings Per ISO19880-1, fueling station equipment assembly markings and warning signs should comply with the applicable clauses of ISO 7010, ISO 3864, ISO 17398 and IEC 60417 <u>If, for example, filtration devices are use,</u> the area	

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						adjacent to the devices filter shall be provided with a label or tag containing the following or equivalent “WARNING – Shutoff the high pressure hydrogen at the filter inlet and exit Disconnect electrical power and then depressurize the filter assembly per manufacturer's instructions before servicing filter.”	
GB 169		08	All	Ge	Is there a need to test the fuelling protocol of the dispenser, as implied in 5.5 clause 6? Make this clear in Chapter 8 that the dispenser tests of ISO 19880-1 shall be carried out.	Add new section, or add to 8.1. Clarify what is required regarding a pressure test of the dispenser hydrogen pipework, in addition to the leak test of 8.3.	
US 090 170		08.02	3 rd pp	Te	100% does not meet US, Europe or Japan requirements.	All tests shall be conducted with the inlet pressure maintained at least 110% the manufacturer's specified maximum allowable working pressure,	
US 091 171		08.03.1		Te/Ed	Is this a leakage test or a decay test? If it is decay, how much pressure over what duration?	If intended to be a decay test, the allowable pressure loss over a specified time period must be indicated.	
DE 172		08.03.2		Ed	Crossed out word should be deleted.	Please delete crossed out word	
US 092 173		08.03.2	2 nd paragraph	Ed	“must” is struck through and should be removed.	In the case of a 70 MPa dispenser, the vented (to atmosphere) dispenser hose, nozzle and breakaway device must shall be tested separately.	
US 093		08.03.2	2 nd pp	Te/Ed	This is a leakage not decay test.	All manual and shut-off valves shall be held in the normal operating position for fueling. In the case of a 70 MPa dispenser, the vented (to atmosphere)	

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174						dispenser hose assembly, nozzle and breakaway device must shall be tested separately.	
US 094 175		08.03.2	3 rd pp	Te/Ed	For tests, test pressure should be 110% of MAWP with reliefs not installed. Note: For production tests, 90% of MAWP with reliefs installed is an adequate Compromise	This dispenser system including any fuel temperature cooling system associated with the dispenser shall be <u>pneumatically tested at 110% of MAWP with reliefs not installed.</u> tested at the MAWP or no less than 90 % of the set point of the pressure relief device protecting the dispenser components and vehicle tank.	
JP 176 19		08.03.2	The 2nd sentence	ed	There is an unnecessary strikethrough in the last sentence.	To erase this strikethrough word, "must".	
DE 177		08.04.2		Ge	Sketch of the test setup would be helpful.	Please provide sketch	
US 095 178		08.04.2	1 st paragraph	Ed	Replace "manufacture" with "manufacturer."	This test shall be conducted at room temperature and minimum temperature specified by the manufacturer.	
NZ 179		08.05.2	1 & 2	te	Paragraph 1 specifies a device simulating an ESS. Paragraph 2 requires the ESS to be activated.	Clarify the test set up.	
GB 180		08.05.2	Para 1	Te	Presumably it is enough to say "The dispenser shall be used to fill an appropriate storage container"?	Change order of sentences 1 & 2, with replacement text in place of existing sentence 1.	
GB 181		08.05.2	Para 1	Te	If the hydrogen is supplied at the dispenser MAWP, the PRV will activate?	Suggest this is changed to "within the pressure limits specified by the dispenser manufacturer for normal operation".	

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GB 182		08.05.2 & 8.6.2	Para 2	Te	Is the requirement 3 seconds or 5 seconds?	Discuss with WG24	
US 096 183		08.06		Ed	The title is Post dispensing , however in the SM seed document (HGV 4.1) and in Figure 3 of this draft, this test is referred to as "Hose Rupture."	Either change 8.6 to Hose rupture or change the title of Figure 3 to Post dispensing.	
GB 184		08.06	Figure 3	Te	What is the purpose of the additional flow meter? The fast opening valve should be attached to a vent line leading to a safe place! Also, there should be a receptacle on the storage container (with a check valve to avoid depressurising the whole container when carrying out the test), plus a way of safely venting the storage container once finished.	Clarify reason for flow meter, or remove. Add detail needed to make the test set-up (maybe this is only an example?) safe.	
GB 185		08.06	Title	Te	The title does not match the test – whilst the section 5.4 seems ok, this test is of an alarm that will be active during fuelling, not after fuelling has been completed. As I understand it, this should be a test of the dispenser meeting the requirements of the section "Limitation of hydrogen released in case of fueling line break" see 8.2.2.6 of ISO 19880-1 draft ISO TC 197 WG24 N429, however I can't see this as a requirement for the dispenser in ISO 19880-2?	Rename test. Add section on "Limitation of hydrogen released in case of fueling line break", of a cross reference to explain that this is to test for this functionality. (A test could be incorporated under this heading to verify that the pressure doesn't fall below that specified in 5.4 as the lower limit, when this is introduced, once fuelling has finished)	
US 097 186		08.06.2	2 nd pp	Te/Ed	Why isn't the test conducted at different pressure levels up to MOP? Why 3 seconds? It is less than the 5 second max in	<u>Perform the hose rupture simulation at the following levels: 25% MOP, 50% MOP, 75% MOP and 100% MOP.</u> <i>Review basis of 3 seconds.</i>	

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					ISO19880-1 – which is fine if there is a reason.		
NZ 187		08.06.2	3	te	If the test is conducted five times, what constitutes a successful test?	Clarify how many 'passes' constitute as successful test.	
GB 188		08.07	All	Ge	Is this adding testing that isn't already in ISO 19880-3? Presumably the breakaway would be installed in the actual dispenser being type approved, not a simulated one?	If not adding anything new, simply reference ISO 19880-3.	
US 099 189		08.07.1	2 nd pp - new	Te/Ed	Consider also physical damage.	<u>Additionally, there shall be no damage, distortion or deformation of the hardware attaching the breakaway to the dispenser.</u>	
NZ 190		08.07.1	heading	ed	The correct term should be 'criteria', not 'criterial'.	Reword: 'criteria'.	
US 098 191		08.07.1, 8.8.1, 8.9.1, 8.10.1, 8.11.1, 8.12.1		Ed	Change titles from <i>Acceptance criterial</i> to <i>Acceptance criteria</i> .	Acceptance eriterial criteria	Accepted
DE 192	5	08.07.2		Ed	No line break between number and unit	Please correct	

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US 100 193		08.08		Te/Ed	<p>What is the intent of this test? This test appears to be bonding to avoid electrostatic discharge.</p> <p>Aren't the hose and nozzle part of the hydrogen "piping" system, which is to be bonded to 10 ohms per 10.2.4 in the post-CD2 19880-1?</p> <p>Hydrogen piping, equipment, frames, and enclosures also need to be bonded.</p> <p>Why is the impedance being checked at multiple voltages up to 1 000 volts?</p>	<p><i>Change the title of 8.8 to "Prevention of electrostatic discharge."</i></p> <p>The bonding resistance from point where the nozzles contacts the vehicle receptacle back to the bonding connection to ground shall be less than 10 ohms.</p> <p>NOTE Even though the fueling assembly needs to provide the electrical continuity required to meet this requirement, the hose assembly does not necessarily have to meet this requirement if separate bonding is provided within the fueling assembly.</p> <p>All dispenser hydrogen piping, equipment, frames and enclosures not addressed in 8.9 shall also be bonded to less than 10 ohms to the bonding connection to ground described above or another ground.</p> <p>NOTES</p> <p>1) The above bonding connection(s) also may be connected to the bonding connection to ground in 8.9.</p> <p>2) See ISO 19880-1 for guidance</p> <p>Perform the resistance test at a value less than or equal to 24 volts.</p>	
DE 194		08.08 and 8.9		Ge	What means "electronically continuous"?	Please for explanation	
NZ 195		08.08.1	1	ed	The requirement should be for electrical continuity.	Reword: '... shall be electrically continuous ...'.	
NZ 196		08.08.1	1	te	A minimum resistance is also necessary to mitigate the risk of a sudden static discharge	Add a minimum resistance consistent with the energy release This could be in the order of 1 MΩ.	

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					potentially providing an ignition source.		
NZ 197		08.08.1	heading	ed	The correct term should be 'criteria', not 'critical'.	Reword: 'criteria'.	
US 101 198		08.09		Te/Ed	What is the intent of this test? This test appears to be bonding to avoid electric shock. Electrical bonding needs to address electrical equipment and conductive parts that can become energized under fault conditions. See post-CD2 19880-1 10.1.3.	<i>Change the title of 8.9 to "Electrical bonding test."</i> <i>Replace or supplement text as follows:</i> Electrical equipment and associated frames and enclosures that can become energized under first fault conditions shall be bonded and designed to be grounded as defined in IEC 60204-1 to prevent electric shock. See 8.8 for additional bonding and grounding requirements to prevent electrostatic discharges in hazardous areas.	
NZ 199		08.09.1	heading	ed	The correct term should be 'criteria', not 'critical'.	Reword: 'criteria'.	
NZ 200		08.10.01	1, paragraph a)	ed	There are two references to 'appliance'.	Replace 'appliance' with 'dispenser'.	
NZ 201		08.10.01	heading	ed	The correct term should be 'criteria', not 'critical'.	Reword: 'criteria'.	
CA 202		08.10.02		Te	Di-electric withstand test is futile for the dispenser. Typically there is only a 120V power to the dispenser, and 24 V distribution within it. All electronics will have to be disconnected to avoid damage from the 1000V test. Once the electronics are disconnected, this test would only be done on approx. 1 m of wire and that is only 120V.	Remove dielectric withstand test from the dispenser standard.	
NZ 203		08.11.01	heading	ed	The correct term should be 'criteria', not 'critical'.	Reword: 'criteria'.	

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US 102 204		08.11.02		Te/Ed	IEC 60529 is more than a rain test. The purpose of an enclosure is to protect the general public from the product and to protect the product from the general public and the elements. This is usually addressed by the manufacturer stipulating the IP code for the product and then demonstrating that the enclosure meets the requirements of the IP code while also demonstrating that the product functions without incident. I would expect an IP code of IP 33 or 34 would be appropriate (child's finger and a substantial rain event (spray and splash). This document does not address the solid ingress (finger test) and may not be severe enough for the weather in Japan or North America > 32 mph (50 km/hr). This section should be reconsidered. Starting with the title "enclosure tests".	<i>This section should be reconsidered. Starting with the title "Enclosure tests".</i>	
NZ 205		08.12.01	heading	ed	The correct term should be 'criteria', not 'criterial'.	Reword: 'criteria'.	
US 103 206		08.12.02	a)	Ed	Change SA E-30 to SAE-30. Also, in last sentence of a) change "24 H" to "24 h"	Half of the panel shall be wiped with a clean cloth lightly oiled with SA E-30 SAE-30 medium machine oil. Each sample shall be allowed to set for 24 H 24 h at room temperature.	
US 104 207		08.12.02	c)	Ed	The references to marking classes should be consistent. Section 7.2 = Class IIIA; Section 8.12.2 c) i) & ii) = Class IIA-1; Annex A.6 = Class III A1.	Suggest to select one style and use throughout.	
NZ 208		09.01	1	ed	The term 'dispensing device' is not defined.	Replace with 'dispenser'.	

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NZ 209		09.02	1	ed	The term 'dispensing device' is not defined.	Replace with 'dispenser'.	
GB 210		1 (All)		Ge	<p>There is a lot of duplication of ISO 19880-1, which may in the future lead to conflicts between the two documents, should the relevant sections ISO 19880-1 develop further as the two documents are being written in parallel.</p> <p>At this stage in time, it is difficult to see how ISO 19880-2 can be a standalone document.</p> <p>It seems to be better suited as a document that provides more in depth detail to what is in ISO 19880-1, and can progress the design and testing of dispensers above that in ISO 19880-1.</p>	<p>To discuss how best to address this issue in the joint meeting of WG19 and WG24.</p> <p>Consider removing repetition of requirements from ISO 19880-2, and writing the document on the basis that standalone dispensers should meet the requirements of X, Y and Z in ISO 19880-1. In addition,</p> <p>(avoiding any requirements that are already in the ISO 19880-1)</p>	
GB 211		1 (All) including introduction		Ge	<p>We are very pleased to see significant progress on this document, especially given the circumstances of ISO TC 197 WG19 having to wait for the on-going work in ISO TC 197 WG24.</p> <p>However, it still isn't clear to us what this document is designed to cover.</p> <p>It is our understanding (maybe incorrectly) that this is for type-approval of a stand-alone, discrete dispensing system, that can theoretically be integrated into a refuelling station where the hydrogen provision is provided by a different system designer, presumably under certain conditions specified by the dispenser designer / manufacturer.</p> <p>If the intention is more than this, and the document is intended to cover all hydrogen dispensers at all hydrogen refuelling stations, even though the dispensing elements of a</p>	<p>To discuss how best to address this issue in the joint meeting of WG19 and WG24.</p> <p>If it is for the dispensing elements of all hydrogen fuelling stations, therefore overlapping ISO 19880-1, consider whether or not there is a clear need for this document at this time, or if it adds confusion.</p> <p>If it is for a stand-alone dispenser, make this clear from the start.</p> <p>Also, does this document need to ensure the dispenser works at the limits of the range of the provision of hydrogen supplied to the dispenser?</p> <p>If so, it would appear that some requirements and testing are missing from the document.</p>	

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2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

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					hydrogen refuelling station are (or should be) adequately covered in ISO 19880-1, it is therefore difficult to understand why this is being done in parallel to the WG24 work at this early stage.		
JP 212 01		1 Scope	The 3rd sentence from the last sentence	ed	There is a typing error at the end of the sentence. " such as valves (ISO 19880-3) and hoses (ISO 19880-3)" isn't appropriate.	To modify to " such as valves (ISO 19880-3), hoses (ISO 19880-5) and fittings (ISO 19880-6) ".	
US 105 213		10.02	Last paragraph	Ed	The reference to ISO/TS 19880-1 is inconsistent with other ISO 19880-1 and ISO/DTR 19880-1 references.	Replace the reference with ISO 19880-1 in anticipation of both documents eventually being published.	
NZ 214		10.03	2	ed	The phrase 'de-energize or depressurize/purge' is unclear. It is assumed 'de-energize' refers to removing electrical energy and depressurize/purge refers to removing hydrogen from the equipment.	Reword: 'de-energize and depressurize or purge'.	
US 106 215		10.03	2 nd paragraph – 1 st sentence	Ed	Replace "safety" with "safely"	Instructions for replacement of equipment shall define methods, when appropriate, to de-energize or depressurize/purge systems as well as any other steps necessary to safety safely conduct the maintenance or service activity.	
US 107 216		10.03	2 nd paragraph – last sentence	Ed	This sentence does not read properly. Perhaps "should that" should be "such that."	Instructions should also consider steps required to restore the equipment to operation should that such that personnel is not exposed to unnecessary hazards and that the hydrogen being dispensed meets ISO 14687-2.	
GB 217		10.04	Para 1	Ed	Typo	"...to properly and safely....", not "safety"	

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US 110 218		A.10		Ed	Since there is no reference in the draft to a Class IV label, should this be deleted?	A.10 Class IV Non-water proof label Shall be made of material that may be soluble in water, and may use water-soluble adhesive for attachment means.	
US 108 219		A.5		Ed	For consistency, remove "said Section" prior to 8.12.	Shall be made of pressure sensitive metal foil requiring no solvent or activator, provided such plates comply with said Section 8.12 Marking Material Adhesion and Legibility.	
US 109 220		A.6		Ed	Add "C" at end of sentence, so it is 150°C.	These materials shall not be located on surfaces having temperatures exceeding 150 °C.	
JP 221 20	Annex A	A.6	The 2nd sentence	ed	Letter " C " is missing after " 150°" in the 2nd sentence in Clause A.6.	To add " C " meaning Celsius to the tail end of the second sentence to express 150°C.	
GB 222		Bibliography		Ed	Missing SAE J2799	Add to bibliography. Confirm if this needs to be a dated reference as not ISO/IEC.	
US 057 223		new		Te	Obvious safety omission	<i>Include a new paragraph in 4.9.2:</i> <u>The connection points between the breakaway and the hose assembly shall be deemed compatible by both manufacturers. Transitional components not deemed suitable are prohibited.</u>	
US 071 224		new		Te/Ed	Base EMC requirements on ISO19880-1 Section 10.3.	<u>4.13.6, Electromagnetic compatibility and interference (EMC)</u> <u>Hydrogen dispensers shall not emit electromagnetic noise that will interfere with other equipment at or near their sites and shall not be adversely affected by electromagnetic noise at or near their sites.</u> <u>The electrical equipment and systems of hydrogen</u>	

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						fueling stations should comply with the applicable parts of the IEC 61000 series of standards. See ISO 19880-1 for guidance.	

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