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Tabular overview of safety standards for refrigeration, air-conditioning, and heat-pump systems and appliances

Background note by the Secretariat

1. By the time of the adoption of the Kigali Amendment to the Montreal Protocol at the Twenty-Eighth Meeting of the Parties in October 2016, the parties to the Protocol had identified ways to deal with various challenges associated with the adoption of the amendment. One of those challenges was ensuring the safe market introduction, manufacturing, operation, maintenance and handling of flammable zero-Global Warming Potential (GWP) and low-GWP refrigerants that are alternatives to hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs). In this regard, the Twenty-Eighth Meeting of the Parties adopted decision XXVIII/4 on the establishment of regular consultations on safety standards, including requests addressed to the Secretariat, the Technology and Economic Assessment Panel and the parties.¹
2. In response to decision XXVIII/4, the following actions were undertaken:
 - The Secretariat liaised with international and regional standards bodies² with a view to holding regular consultations on safety standards and inform the parties accordingly;
 - The Technology and Economic Assessment Panel established a task force which prepared a report on safety standards for the consideration of the Open-ended Working Group at its 39th meeting in July 2017. The report provided information on progress in the revision of international safety standards; information concerning tests and/or risk assessments and their results relevant to safety standards; and assessment of the implications of international standards for the implementation of the decisions of the Meeting of the Parties on the accelerated phase-out of HCFCs and HFC control measures and recommendations to the parties;³
 - A number of parties submitted to the Secretariat information on their domestic safety standards relevant to the use of low-GWP flammable refrigerants which were considered by the Technology and Economic Assessment Panel in the preparation of its report and

¹ <http://ozone.unep.org/en/printpdf/book/export/html/41479>

² International Electrotechnical Commission (IEC), International Standards Organization (ISO), the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC), UL (formerly known as Underwriters Laboratories), the American National Standards Institute (ANSI), the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and others.

³ http://conf.montreal-protocol.org/meeting/owg/owg-39/presession/Background-Documents/TEAP-XXVIII_4-TF-Report-May%202017.pdf

were compiled in an information note prepared by the Secretariat (UNEP/OzL.Pro.WG.1/39/INF/4);⁴

- A one-day workshop on safety standards relevant to the safe use of low-GWP alternatives was held prior to the thirty-ninth meeting of the Open-ended Working Group in July 2017, a summary of which was presented to the Open-ended Working Group (UNEP/OzL.Pro.WG.1/39/4).⁵

3. To facilitate the parties' discussions on the matter at the workshop and the thirty-ninth meeting of the Open-ended Working Group, the Secretariat also prepared the following three briefing notes:

- (a) Safety standards relevant to Refrigeration, Air-Conditioning and Heat Pump equipment;⁶
- (b) Updating the refrigeration, air-conditioning and heat pump (RACHP) safety standards;⁷ and
- (c) Application of safety standards to Refrigeration, Air-Conditioning and Heat Pump equipment – a lifetime perspective.⁸

4. Further consideration of safety issues of zero-GWP and low-GWP alternatives in refrigeration, air-conditioning and heat-pump equipment led to the adoption of decision XXIX/11 on safety standards by the Twenty-Ninth Meeting of the Parties in November 2017. By that decision, the Secretariat was requested to hold regular consultations with relevant standards bodies with a view to providing, with regard to standards for flammable low-GWP refrigerants, a tabular overview of relevant safety standards, drawing on the 2017 report of the task force on decision XXVIII/4 and the outcome of the consultations.

5. The tabular overview, which should also include any relevant information submitted on a voluntary basis to the Secretariat by parties or by national and regional standards bodies, shall provide concise information on the:

- (a) Scope of activities, appliances or products covered;
- (b) Content, namely the safety and relevant technical aspects addressed;
- (c) Responsible standards body and its subsidiary body in charge of the standard, including hyperlinks to publicly accessible contact details as well as to information on content and review process;
- (d) Status of the review (process and content under review).

6. The Secretariat was also requested to make the above information accessible on its website and to ensure an update of the tabular overview at least prior to each meeting of the parties up until the Thirty-Fourth Meeting of the Parties, when parties should consider whether to renew that request to the Secretariat. Parties were further invited to update information submitted pursuant to decision XXVIII/4 by 1 January 2020.

7. In response to decision XXIX/11, the Secretariat continued its liaison with international and regional standards bodies and prepared, in consultation with those bodies as well as a number of experts on standards, a first version of the requested tabular overview, presented in the following section. The Secretariat wishes to express its appreciation to all standards bodies and experts that have provided valuable contributions in the preparation of this overview.

8. The information included in the tabular overview is intended only as background information for the Open-ended Working Group at its fortieth meeting. The Secretariat would appreciate receiving comments from parties and other stakeholders with a view to taking them into account before it presents a relevant information note to the Thirtieth Meeting of the Parties for its consideration, as requested in decision XXIX/11.

⁴ <http://conf.montreal-protocol.org/meeting/owwg/owwg-39/presession/Information-Documents/OEWG39-INF4-E.pdf>

⁵ <http://conf.montreal-protocol.org/meeting/workshops/safety-and-standards/presession/SitePages/Home.aspx>

⁶ http://conf.montreal-protocol.org/meeting/owwg/owwg-39/presession/briefingnotes/safety_standards_relevant_to_refrigeration_ac_and_heat_pump_equipment.pdf

⁷ http://conf.montreal-protocol.org/meeting/owwg/owwg-39/presession/briefingnotes/updates_refrigeration_ac_and_heat_pump_safety_standards.pdf

⁸ <http://conf.montreal-protocol.org/meeting/workshops/safety-and-standards/presession/briefingnotes/application-of-safety-standards-to-RACHP.pdf>

9. The current version of the tabular overview covers the main safety standards for refrigeration, air-conditioning, and heat-pump systems and appliances. The overview is presented below following a description of its basic structure.

Basic structure of the tabular overview

10. The tabular overview follows the basic structure of the Technology and Economic Assessment Panel task force report on decision XXVIII/4, where IEC and ISO safety standards were listed in chapter 2. The standards are separated into two categories:

Main system safety standards (see table 1)

- vertical system safety standards (also known as product standards) comprising safety aspects for a specific product or system, or a family of products or systems;
- horizontal system safety standards (also known as group safety standard) comprising safety aspects applicable to several products or systems, or a family of similar products or systems; and

Supplementary standards (see table 2)

- These standards support the main system safety standards for refrigeration, air-conditioning, and heat-pump systems and appliances, for example, standards for refrigerant classification or standards for hazardous areas.

11. A deliberate choice has been made not to include a complete list of supplementary standards at this stage but only mention a few selected examples. For instance, the IEC 60079-15 is included, but not the complete list of the 33 parts of the IEC 60079 series, though most of them are relevant for the use of flammable refrigerants. With regard to national standards, only limited information is included in the overview at present.

12. The columns of tables 1 and 2 contain the following information:

- **“Standard”**: The designation of the standard, typically comprising letters which are an abbreviation of the standardisation organisation and type of standard, followed by a number, which is typically simply a serial number. For instance, for IEC 60335-2-40 the “IEC” is an abbreviation of “International Electrotechnical Commission”, 60335 is the serial number shared by the 100+ standards of the IEC 60335-series, and -2-40 are serial numbers that in the 60335 series indicates the type of application covered by the specific standard.
- **“Scope of the standard/title”**: The title describing the scope of the standard; sometimes this is a short version of the official title.
- **“Technical aspects”**: Specification of aspects covered by the standard.
- **“Specific committee”**: The committee responsible for preparing the standard. The writing itself can be delegated to working groups, but the committee maintains responsibility.
- **“Status”**: Description of when the last version or amendment to the standard was published, and dates for the next official step in the process for the revision or review of the standard, when these dates are available.
- **“Further information”**: Additional information about the standard and the activities in the working groups writing the standard especially linked to the requirements for flammable refrigerants.

13. For table 1 (vertical and horizontal standards), there are a number of additional columns to describe the market sectors and the stages in the product life cycle which are within the scope of the standard:

- **Market sectors**: “Domestic refrigeration”, “Commercial refrigeration”, “Industrial systems”, “Transport refrigeration”, “Air-to-air conditioners and heat pumps”, “Water heating heat pumps”, “Chillers”, “Tumble driers”, and “Vehicle air conditioning”
- **Stages in the product life cycle**: “Equipment/system design”, “Installation of new equipment/system”, “Operation”, “Maintenance and repair”, and “Decommissioning”

Table 1: System safety standards

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors							Life-cycle stages ¹¹				
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation
Vertical standards																	
ISO 13043	Road vehicles – Refrigerant systems used in mobile air conditioning systems (MAC)	Safety requirements	ISO/TC22/SC34 https://www.iso.org/comitee/5383858/x/catalogue	Published 2011. Confirmed 2015. Next review is 2020.	This standard addresses the use of only R-134a, R-1234yf and R-744.							X	X	X	X		
IEC 60335-2-11	Household and similar electrical appliances – Safety	Particular requirements for tumble dryers	IEC/TC61 www.iec.ch/tc61	Published 2015	Currently allows 150 gr of flammable refrigerant. No open proposals on changes to the refrigerant charge limits.							X	X	X	X		

⁹ The year of the latest complete publication and/or amendment is given.

¹⁰ The details on future work will not be final until the final voting on each individual standardisation project.

¹¹ Standards derived from the IEC 60335 series (the name usually includes “Household and similar electrical appliances – Safety”) cover explicitly only system design. These standards cover installation, operation and repair indirectly by specifying what is required to be written in the manuals of the appliances. This indirect coverage is indicated by ”X” in the respective cells.

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors							Life-cycle stages ¹¹					
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation	Maintenance and repair
IEC 60335-2-24	Household and similar electrical appliances – Safety	Particular requirements for refrigerating appliances, ice-cream appliances and ice makers	IEC/TC61/SC61C www.iec.ch/sc61c	Edition 7.2 Published 2017 and ISH1:2018	Currently allows 150 g of flammable refrigerant. No open proposals on changes to the refrigerant charge limits.	X								X	X	X		
IEC 60335-2-40	Household and similar electrical appliances – Safety	Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers	IEC/TC61/SC61D www.iec.ch/sc61d	Published 2018. Next version planned for early 2021	Several working groups are addressing aspects relating to charge limits. WG9 focuses on A2L refrigerants, while WG16 focuses on A2/A3 refrigerants. 2 rounds of voting needed to reach publication				X	X	X			X	X	X	X	X
IEC 60335-2-89	Household and similar electrical appliances – Safety	Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	IEC/TC61/SC61C www.iec.ch/sc61c	Published 2015	CDV circulated in April 2018 with new upper limit on refrigerant charge approx. 500 g of propane and 1,2 kg of A2L refrigerant. Proposal needs to pass 2 rounds of voting. Publication possible mid-2019.	X								X	X	X		
EN 60335-2-11	Household and similar electrical appliances – Safety	Particular requirements for tumble dryers	CENELEC/TC61 https://www.cenelec.eu/about-cenelec/what-we-do/technology-sectors/household-appliances.html	Published 2016	Currently allows 150 g of flammable refrigerant. Copies IEC 60335-2-11:2008 with minor modifications related to EU legislation. The general policy is to adopt latest IEC version with minor modifications.							X		X	X	X		

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors							Life-cycle stages ¹¹				
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation
EN 60335-2-24	Household and similar electrical appliances – Safety	Particular requirements for refrigerating appliances, ice-cream appliances and ice makers	CENELEC/TC61 https://www.cenelec.eu/aboutcenelec/whatwedo/technologysectors/householdappliances.html	Published 2010	Currently allows 150 g of flammable refrigerant. Copies IEC 60335-2-24:2010 with minor modifications related to EU legislation. The general policy is to adopt latest IEC version with minor modifications.	X								X	X	X	
EN 60335-2-40	Household and similar electrical appliances – Safety	Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers	CENELEC/TC61 https://www.cenelec.eu/aboutcenelec/whatwedo/technologysectors/householdappliances.html	Published 2013	Derived from 2002 version of IEC 60335-2-40 with amendments. Proposals to update to 2013 version, but may end with 2018 version.				X	X	X			X	X	X	X
EN 60335-2-89	Household and similar electrical appliances – Safety	Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	CENELEC/TC61 https://www.cenelec.eu/aboutcenelec/whatwedo/technologysectors/householdappliances.html	Published 2016	Copies IEC 60335-2-89 version 2010 and amendment 1 from 2012 with minor modifications related to EU legislation. Currently allows 150 g of flammable refrigerant. When the IEC standard increases the allowed charges it is likely to be copied into EN 60335-2-89	X								X	X	X	
GB 4706.13	Household and similar electrical appliances – Safety	Particular requirements for refrigerating appliances, ice-cream appliances and ice makers	Standardization administration of the People’s Republic of China SAC/TC46	Published 2014	Equally adopted from IEC 60335-2-24:2012. Currently allows 150 g of flammable refrigerant.	X								X	X	X	

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors							Life-cycle stages ¹¹				
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation
GB 4706.32	Household and similar electrical appliances – Safety	Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers	Standardization administration of the People’s Republic of China SAC/TC46	Published 2012. New revision planned end of 2018 or in 2019	Equally adopted from IEC 60335-2-40:2005, but only applied to systems up to 14 kW capacity. Under revision to adopt the IEC version from 2016.				X	X			X	X	X	X	X
GB 4706.102	Household and similar electrical appliances – Safety	Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	Standardization administration of the People’s Republic of China SAC/TC46	Published 2010	Equally adopted from IEC 60335-2-89:2010. Currently allows 150 g of flammable refrigerant.	X							X	X	X		
UL 399	Drinking-Water Coolers	Drinking-Water Coolers	UL STP No. 399 www.ul.com	Published 2017	Allows 270 g of A2 and 60 g of A3 flammable refrigerant. A new proposal was published in March 2018 but does not change charge amounts	X							X	X	X	X	X
UL 541	Refrigerated Vending Machines		UL STP No. 751 www.ul.com	Published 2016	Allows 500 g of A2 and 150 g of A3 flammable refrigerant.	X							X	X	X	X	X

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors							Life-cycle stages ¹¹				
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation
UL 563	Ice Makers		UL STP No. 563 www.ul.com	Published 2017	Allows 500 g of A2 and 150 g of A3 flammable refrigerant.	X							X	X	X	X	X
UL 621	Ice Cream Makers		UL STP No. 621 www.ul.com	Published 2018	Does not allow flammable refrigerants	X							X	X	X	X	X
UL 60335-2-24	Household and similar electrical appliances – Safety	Particular requirements for refrigerating appliances, ice-cream appliances and ice makers	UL STP 60335-2-24 www.ul.com	Published 2017	This standard is derived from IEC 60335-2-24. Currently allows 150 g of flammable refrigerant.	X							X	X	X		
UL 60335-2-40	Household and similar electrical appliances – Safety	Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers	UL STP 60335-2-40 www.ul.com	Published 2017	UL 2-40 edition 2 published 2017 is derived from IEC 60335-2-40 edition 5.1, but with more restrictive amendments for flammable refrigerants. It is under revision for edition 3 to include requirements for A2L refrigerants (derived from IEC 2-40 edition 6 published 2018).				X	X	X		X	X	X	X	X

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors								Life-cycle stages ¹¹				
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation	Maintenance and repair
UL 60335-2-89	Household and similar electrical appliances – Safety	Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	UL LCC	Published in 2017	This standard is derived from IEC 60335-2-89. Currently allows 150 g of flammable refrigerant.	X								X	X	X		
Horizontal standards																		
ISO 5149-1	Refrigerating systems and heat pumps — Safety and environmental requirements	Basic requirements, definitions, classification and selection criteria	ISO/TC86/SC1 https://www.iso.org/committee/50362/x/catalogue	Published in 2015. To be reviewed in 2019	Major revision of refrigerant charge limits in 2014, with a correction to A2L requirements in 2015. Several proposals for modifying charge limits are being considered by the working group. No official timeline agreed, but two rounds of voting would be needed, so publication could be in 2020	X	X	X	X	X	X	X	X	X	X	X		
ISO 5149-2	Refrigerating systems and heat pumps — Safety and environmental requirements	Design, construction, testing, marking and documentation	ISO/TC86/SC1 https://www.iso.org/committee/50362/x/catalogue	Published in 2014. To be reviewed in 2019	Focus of the working group is on part 1 where the charge limits are stated. Some work is ongoing on aligning text with EN378.	X	X	X	X	X	X	X	X	X	X	X		

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors								Life-cycle stages ¹¹					
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation	Maintenance and repair	Decommissioning
ISO 5149-3	Refrigerating systems and heat pumps — Safety and environmental requirements	Installation site and personal protection	ISO/TC86/SC1 https://www.iso.org/committee/50362/x/catalogue	Published in 2014. To be reviewed in 2019	Focus of the working group is on part 1 where the charge limits are stated. Some work is ongoing on aligning text with EN378	X	X	X	X	X	X	X	X			X			
ISO 5149-4	Refrigerating systems and heat pumps — Safety and environmental requirements	Operation, maintenance, repair and recovery	ISO/TC86/SC1 https://www.iso.org/committee/50362/x/catalogue	Published in 2014. To be reviewed in 2019	Focus of the working group is on part 1 where the charge limits are stated. Since there is a proposal to replace EN378-4 with ISO5149-4 there is likely to come a set of proposals to align with EN378-4 before it is replaced	X	X	X	X	X	X	X	X				X	X	X
ANSI/ASHRAE 15	Safety Standard for Refrigeration Systems	Design, construction, installation, and operation of refrigeration systems	SSPC 15 www.ashrae.org	Published in 2016. Under continuous review	Work is ongoing on adding requirements for A2L refrigerants to the standard		X	X		X	X	X				X	X	X	X
ANSI/IIAR 2	American National Standard for Safe Design of Closed-Circuit Ammonia Refrigeration Systems	Closed-Circuit Ammonia Refrigeration Systems	www.iiar.org	Published in 2014	Draft amendment adds requirements for absorption systems using ammonia as refrigerant			X				X				X	X	X	X

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors										Life-cycle stages ¹¹					
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation	Maintenance and repair	Decommissioning		
EN 378-1	Refrigerating systems and heat pumps — Safety and environmental requirements	Basic requirements, definitions, classification and selection criteria	CEN/TC182/WG6 https://standards.cen.eu/dyn/www/f?p=204:7:0:::FS_P_ORG_ID:6163&cs=1C49DFDD906E8EEECF036CBD60784EA80	Published in 2016	A2L requirements were added in 2016. Several proposals for modifying charge limits are being considered by the working group. Two rounds of voting will be needed and timeline is not yet agreed. Publication could be in 2020	X	X	X	X	X	X	X	X	X	X	X	X	X			
EN 378-2	Refrigerating systems and heat pumps — Safety and environmental requirements	Design, construction, testing, marking and documentation	CEN/TC182/WG6 https://standards.cen.eu/dyn/www/f?p=204:7:0:::FS_P_ORG_ID:6163&cs=1C49DFDD906E8EEECF036CBD60784EA80	Published in 2016	Focus of the working group is on the other 3 parts	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
EN 378-3	Refrigerating systems and heat pumps — Safety and environmental requirements	Installation site and personal protection	CEN/TC182/WG6 https://standards.cen.eu/dyn/www/f?p=204:7:0:::FS_P_ORG_ID:6163&cs=1C49DFDD906E8EEECF036CBD60784EA80	Published in 2016	A proposal for an amendment related to installation site is being reviewed by working group. Can go out for voting mid-2018, with publication in 2019	X	X	X	X	X	X	X	X	X	X	X	X	X	X		

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ⁹	Further information ¹⁰	Market sectors								Life-cycle stages ¹¹				
						Domestic refrigeration	Commercial refrigeration	Industrial systems	Transport refrigeration	Air-to-air conditioners and heat pumps	Water heating heat pumps	Chillers	Tumble driers	Vehicle air conditioning	Equipment/system design	Installation of new equipment/system	Operation	Maintenance and repair
EN 378-4	Refrigerating systems and heat pumps — Safety and environmental requirements	Operation, maintenance, repair and recovery	CEN/TC182/WG6 https://standards.cen.eu/dyn/www/f?p=204:7:0:::FSP_ORG_ID:6163&cs=1C49DFDD906E8EEECF036CBD60784EA80	Published in 2016	An amendment on tightness testing is prepared for first round of voting (enquiry vote). It is also proposed to remove EN378-4 and use ISO5149-4 instead (possibly with minor modifications). Publication of amendment could be late 2018, switching to ISO5149-4 could be 2020	X	X	X	X	X	X	X	X			X	X	X
GB/T 9237	Refrigerating systems and heat pumps	Safety and environmental requirements	Standardization administration of the People's Republic of China SAC/TC238	Published in 2017	Derived from ISO 5149:2014 part 1 to 4, and enforced from 1 st of January 2018. It is only used on systems with capacity higher than 14 kW	X	X	X	X	X	X	X		X	X	X	X	X

Table 2: Supplementary standards

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ¹²	Further information ¹³
ISO 817	Refrigerants	Designation and safety classification	ISO/TC 86/SC 8 https://www.iso.org/committee/50388.html	Published in 2017	The refrigerant tables of the standard are being moved to a web-page to allow continuously adding new refrigerants. The long term plan is to harmonize the requirements with ASHRAE 34 with an eventual goal of one standard.
IEC 60079-10-1	Classification of areas - Explosive gas atmospheres	Provides guidance on assessing and ranking the potential for an explosion due the possible release of flammable gas.	IEC/TC31/SC31J http://www.iec.ch/dyn/www/f?p=103:7:2291137358353:::FSP_ORG_ID,FSP_LANG_ID:1333,25	Published in 2016	Currently does not consider any special conditions that may be relevant as further guidance for A2L refrigerants. Not applicable for domestic applications. Drafting for the next revision has begun.
IEC 60079-13	Equipment protection by pressurized room "p" and artificially ventilated room "v"	Provides requirements where mechanically induced ventilation is used to reduce the hazard due to flammable gas.	IEC/TC31 www.iec.ch/tc31	Published in 2017	Not applicable for domestic applications. Drafting for the next revision has begun.
IEC 60079-14	Explosive atmospheres - Part 14: Electrical installations design, selection and erection	Provide requirements for the types of electrical equipment and electrical installations in areas classified under IEC 60079-10-1.	IEC/TC31/SC31J http://www.iec.ch/dyn/www/f?p=103:7:2291137358353:::FSP_ORG_ID,FSP_LANG_ID:1333,25	Published in 2016	Currently does not consider any special conditions that may be relevant as further guidance for A2L refrigerants. Refers to other parts of the IEC 60079 series for specific details of equipment construction and other hazards such as ignition due to electrostatic discharges. Not applicable for domestic applications. Drafting for the next revision has begun.
IEC 60079-15	Explosive atmospheres – Part 15: Equipment protection by type of protection "n"	Equipment protection by type of protection "n"	IEC/TC31 www.iec.ch/tc31	Published in 2017	This standard is referenced by most system safety standards for protection against ignition of leaked flammable refrigerant. The plan is to phase out this standard. For the safety standards, this is a minor problem, since they refer to the 2010 version. This is not a long-term solution, but it is not yet decided which reference to use instead in the system safety standards.

¹² The year of the latest complete publication and/or amendment is given.

¹³ The details on future work will not be final until the final voting on each individual standardisation project.

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ¹²	Further information ¹³
IEC 60079-29-1	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases	Performance requirements of detectors for flammable gases	IEC/TC31 www.iec.ch/tc31	Published in 2016	
IEC 60079-29-2	Explosive atmospheres - Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen	Selection, installation, use and maintenance of detectors for flammable gases	IEC/TC31/SC31J http://www.iec.ch/dyn/www/f?p=103:7:2291137358353:::FSP_ORG_ID.FSP_LANG_ID:1232.25	Published in 2015	Other parts of the IEC 60079 series specify requirements for construction and performance of gas detectors. Not applicable for domestic applications.
ISO/IEC 80079-20-1	Material characteristics for gas and vapour classification - Test methods and data.	Includes methods for testing a range of flammable gas characteristics and data tables for over 300 flammable gases and vapours.	IEC/TC31/SC31M http://www.iec.ch/dyn/www/f?p=103:7:2291137358353:::FSP_ORG_ID.FSP_LANG_ID:1453.25	Published in 2017	Does not include A2L refrigerants and this gap should be closed so that the IEC 60079 series and ISO 80079 series can be applied correctly. Data for A2 and A3 refrigerants may vary from ISO 817 and variances should be reconciled between both standards.
ISO 80079-36	Non-electrical equipment for explosive atmospheres - Basic method and requirements.	Provides basic requirements for prevention of ignition of flammable gases due to mechanical equipment.	IEC/TC31/SC31M http://www.iec.ch/dyn/www/f?p=103:7:2291137358353:::FSP_ORG_ID.FSP_LANG_ID:1453.25	Published in 2016	New standard currently not widely applied for common refrigeration systems. References other parts of the ISO 80079 series for particular construction details. Not applicable for domestic applications.
ANSI/ASHRAE 34	Designation and Classification of Refrigerants	Designation and Classification of Refrigerants	ASHRAE http://sspc34.ashraepcs.org	Published in 2016. Under continuous review and revision. Next edition 2019	The standard is continuously amended with new refrigerants.
ANSI/IIAR 3	Ammonia Refrigeration Valves	Provides minimum construction standard and performance conditions for ammonia valves	IIAR Standards Committee www.iiar.org	Updated in 2017	Generally considered a manufacturer's standard. Does not cover atmospheric relief valves.
EN 13313	Refrigerating systems and heat pumps	Competence of personnel	CEN/TC182/WG4 https://standards.cen.eu/dyn/www/f?p=CENWEB:7:0:::FSP_ORG_ID:7291&cs=1CF42611292481F65FFBB7BACD0DF26B4	Published 2010	The plan is to replace this standard with an ISO standard. The ISO standard is under development by the same working group as has authored the EN standard.

Standard	Scope of the standard/title	Technical aspects	Specific committee	Status ¹²	Further information ¹³
UL 2182	Refrigerants	Safety classification	UL 2182 Standard Technical Panel (STP) https://ulstandards.ul.com/develop-standards/stps/stp-charts/	This ANSI/UL Standard for Safety consists of the Second Edition including revisions through January 24, 2017	Classified refrigerants and their manufacturers can be found in the UL Online Certification Directory under the product category or CCN of SLGV.