



SCDF

The Life Saving Force

... for a safer Singapore

SINGAPORE CIVIL DEFENCE FORCE

Date : 13 March 2026

Our Ref: CD/05/03/01

Attn: Manufacturers / Suppliers / Distributors

Dear Sir/Madam,

GUIDELINES ON THE USE OF FLAMMABLE REFRIGERANTS IN SINGAPORE

Since 2011, SCDF has, in consultation with the relevant government agencies and industry stakeholders, reviewed the fire safety risks associated with the use of flammable refrigerants in the various refrigeration and air conditioning (RAC) equipment.

2. This document serves to consolidate and align the requirements which SCDF has implemented for the various RAC equipment where flammable refrigerants are allowed for use. It is also presupposed that all other relevant regulatory and statutory requirements will be complied with. Unless otherwise informed, all other non-listed RAC equipment shall continue to use non-flammable refrigerants. This circular shall take immediate effect and supersedes the relevant circulars stated in Table 1 appended below.

4. The information in this document is based on SCDF's present state of knowledge and we reserve the rights to amend the contents of this document at any time in the future should there be a need to do so. This document is also available at <https://www.scdf.gov.sg/fire-safety-services-listing/downloads/acts-codes-and-regulations>, and interested parties may refer to it for any future updates.

5. Please convey the contents of this document to the parties concerned. For any inquiries or clarifications, please contact CPT Sheryl Sia (e-mail: Sheryl_SIA@scdf.gov.sg or SCDF_Haz_feedback@scdf.gov.sg).



SCDF – A member of the Home Team

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Yours sincerely,

(transmitted via email)

CPT Sheryl Sia

HazMat Department

Singapore Civil Defence Force



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TABLE 1: CIRCULARS ON EQUIPMENT USING FLAMMABLE REFRIGERANTS

Reference No.	Title	Date Issued	Updates
SCDF/HAZ/14/03/02/01	Review on use of hydrocarbon refrigerant in Singapore	6 December 2011	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
SCDF/HAZ/14/03/02/01	Implementation of advisory label for domestic refrigerators using flammable refrigerants in Singapore	15 June 2012	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
SCDF/HAZ/14/03/02/01	Regulatory requirements for the usage of flammable refrigerant in stand-alone commercial refrigeration system in Singapore	25 January 2013	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
CD/HAZ/14/03/02/01	Review on the use of flammable refrigerants in Singapore	17 June 2015	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
CD/HAZ/14/03/02/01	Regulatory requirements for the usage of R32 refrigerant in domestic single-split air conditioning system in Singapore	13 July 2015	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
CD/HAZ/14/03/02/01	Regulatory requirements for the usage of R32 refrigerant in domestic split air conditioning system in Singapore	19 September 2016	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
CD/HAZ/14/03/02/01	Regulatory requirements for the usage of R1234YF refrigerant in mobile air conditioning system in Singapore	14 November 2016	-

CD/HAZ/14/03/02/01	Circular on the use of R32 refrigerant in air conditioning systems in Singapore	3 May 2021	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
CD/05/03/01	Circular on the use of R32 and R290 refrigerants in portable air conditioners in Singapore	13 January 2025	Superseded by 'Guidelines on the use of flammable refrigerants in Singapore' issued on 13 March 2026
CD/05/03/01	Guidelines on the use of flammable refrigerants in Singapore	13 March 2026	-

MANAGEMENT OF FIRE SAFETY ON THE USE OF FLAMMABLE REFRIGERANTS

S/N	Applications	Allowed Flammable Refrigerants	Additional Requirements
1	Air-Conditioning Equipment/Systems		
1.1	<p><u>Air-Conditioners regulated under Consumer Protection (Safety Requirements) Regulations</u></p> <p>Refers to room air-conditioners, which are electrical appliances intended for household use and designed as self-contained units for mounting on a window or through a wall to provide conditioned air to an enclosed area, with rated voltage of not more than 250 VAC.</p>	No restriction	Refer to Consumer Protection (Safety Requirements) Regulations

<p>1.2</p>	<p>Split Air-Conditioning Systems</p> <p>i. Single-split</p> <p>Refers to air-conditioning system which consist of one outdoor unit (condensing unit, CU) and one indoor unit (fan coil unit, FCU). The outdoor and indoor units are connected by pipes and can be located at a distance apart.</p> <p>ii. Multi-split</p> <p>Refers to air-conditioning system which consist of one outdoor unit (condensing unit, CU) and <u>more than one</u> indoor unit (fan coil unit, FCU). The outdoor and indoor units are connected by pipes and can be located at a distance apart.</p> <p>iii. Variable Refrigerant Flow (VRF)</p> <p>Similar to the multi-split system but VRF air-conditioning system is able to precisely control refrigerant flow to provide individual heating or cooling to different zones</p>	<p><u>A2L</u> <u>R-32</u></p>	<p>All air-conditioning systems for domestic, commercial and industrial premises up to a capacity of 17.6 kW.</p> <p><u>Additional requirements with reference to IEC 60335-2-40: -</u></p> <p>i. Where one additional safety measure is required,</p> <ul style="list-style-type: none"> ▪ For building/room with no mechanical ventilation system, safety alarms shall be the primary adopted safety measure ▪ For building/room with existing mechanical ventilation system, the ventilation system can be used as the required safety measure <p>ii. Where two additional safety measures are required,</p> <ul style="list-style-type: none"> ▪ For building/room with no mechanical ventilation system, safety alarm shall be the primary adopted safety measure accompanied by either ventilation system or a safety shut-off valve ▪ For building/room with existing mechanical ventilation system, the ventilation system can be used as one of the required safety measures accompanied by safety alarm
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			<p>iii. Leak detection system linked to safety measure(s)</p> <ul style="list-style-type: none"> ▪ In the event of a faulty leak detector, the affected air-conditioning unit shall be shut down automatically by the system and an error shall be displayed on the remote controller. This is to prevent user from continuing to operate the air-conditioning unit without rectifying the faulty leak detector. ▪ In the event a leak is detected, the affected air-conditioning unit shall be shut down automatically by the system and an error shall be displayed on the remote controller. The implemented safety measure(s) shall be activated to alert user to take corrective actions before the affected air-conditioning unit is allowed to operate again. <p><u>To note:</u></p> <ul style="list-style-type: none"> ▪ All safety measures adopted are to follow requirements stated in the latest IEC 60335-2-40
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S/N	Applications	Allowed Flammable Refrigerants	Additional Requirements
1.3	<p>Portable Air-Conditioners (PAC)</p> <p>Refers to a self-contained, factory sealed, single package units that are designed for easy movement within occupancy spaces, and includes components such as compressors, condensers, evaporators, and fans within a single housing.</p>	<p><u>A2L</u> R-32</p> <p><u>A3</u> R-290</p>	<p>Flammable refrigerants shall be hermetically sealed within the equipment and maximum charge limits allowed are as follows:</p> <p>R-32 (Difluoromethane) – 2.45kg R-290 (Propane) – 0.30kg</p>
1.4	<p>Water-cooled Chillers</p> <p>Chillers typically cool water, which is then circulated to provide comfort cooling throughout a building or other location.</p>	<p><u>A2L</u> R-32 R-1234yf R-452B R-454A R-454B R-454C</p>	<p>The refrigerant shall be contained within the equipment and separated from occupied spaces.</p> <p>For non-industrial premises, there shall not be a separate bulk storage or bulk transportation of flammable refrigerants.</p> <p>Users should ensure that the installation have satisfied all relevant regulatory requirements e.g. SCDF's plans submission, MOM's workplace safety and health etc.</p>
2	Refrigeration Equipment		
2.1	<p><u>Domestic Refrigerators regulated under Consumer Protection (Safety Requirements) Regulations</u></p>	No restriction	Refer to Consumer Protection (Safety Requirements) Regulations

S/N	Applications	Allowed Flammable Refrigerants	Additional Requirements
	Refers to refrigerators, which are electrical appliances intended for household use that operate on the vapour compression principle for food storage and preservation, with rated voltage of not more than 250 VAC.		Flammable refrigerant amount shall not exceed 150g and the flammable refrigerant must be hermetically sealed within the equipment.
2.2	<p>Commercial Stand-Alone Refrigeration Unit</p> <p>Commercial refrigeration, or retail food refrigeration, refers to stand-alone appliances designed to store, display, process, or dispense chilled or frozen goods within retail settings such as supermarket, cafes, bars and restaurants.</p> <p>These appliances include, but not limited to, refrigerated display and storage cabinets, refrigerated trolley cabinets, plug-in display cabinets, beverage coolers and self-contained refrigerated food and beverage processing and dispensing equipment.</p>	<p><u>A2L</u> R-1234yf R-1234ze(E) R-454C R-455A R-457A R-516A</p> <p><u>A3</u> R-290* R600a#</p>	<p>Refrigerants shall be hermetically sealed within the equipment and maximum charge limits¹ allowed is as follows:</p> <ul style="list-style-type: none"> ▪ Not more than 13 times the LFL of the flammable refrigerant or 1.2kg in any refrigerating circuit, whichever smaller. <p><u>In addition:</u> *R-290 (A3) charge limit of 500g for open stand-alone units, 300g for those with doors and drawers. All other R-290 setups to remain at 150g.</p> <p>#R600a charge limit must not exceed 150g.</p>

¹ Calculation of maximum charge limits is based on IEC 60335-2-89 Edition 3.0 2019-06

S/N	Applications	Allowed Flammable Refrigerants	Additional Requirements
2.3	<p>Stand-alone Ice Machines</p> <p>Commercial ice machines are used in commercial establishments (e.g., hotels, restaurants, convenience stores) to produce ice for consumer use.</p>	<p><u>A2L</u> R-1234yf R-454C R-455A R-457A R-516A R-32# R-454A# R-454B#</p> <p><u>A3</u> R-290*</p>	<p>Refrigerants shall be hermetically sealed within the equipment and maximum charge limits¹ allowed is as follows:</p> <ul style="list-style-type: none"> ▪ Not more than 13 times the LFL of the flammable refrigerant or 1.2kg in any refrigerating circuit, whichever smaller. <p>#Only for self-contained batch-type commercial ice machine with harvest rate greater than 1,000 lb (approx. 453kg) ice per 24hrs.</p> <p><u>In addition:</u> *R-290 (A3) charge limit of 500g for open stand-alone units, 300g for those with doors and drawers. All other R-290 setups to remain at 150g.</p>
2.4	<p>Industrial Process Refrigeration (IPR)</p> <p>IPR systems cool process streams in industrial applications, for example, machining of metal products, fermentation of beer, or operation of hydraulic circuits etc.</p> <p>Note: Lab freezers chillers may be assessed under IPR if company</p>	<p><u>A2L</u> R-1234yf R-1234ze R-454C R-455A R-457A R-516A</p> <p>R-32# R-454A## R-454B#</p>	<p>To be used in all refrigeration equipment meant for IPR including both chillers and non-chillers.</p> <p>#Only for chillers and for equipment where the temperature of the refrigerant entering the evaporator is less than or equal to -30°C.</p> <p><u>In addition:</u> *R454A may be used for equipment with a refrigerant charge capacity less than 200 pounds (90kg) or in high temperature side of a cascade</p>

S/N	Applications	Allowed Flammable Refrigerants	Additional Requirements
	inform that this appliance is used in industrial setting (e.g., pharmaceutical process cooling).		<p>system with the refrigerant temperature entering the evaporator higher than -30°C.</p> <p>The use of any other flammable refrigerants not listed can be allowed if:</p> <ul style="list-style-type: none"> ▪ The flammable refrigerant is inherent to the industrial process and; ▪ Have satisfied all relevant regulatory requirements e.g. SCDF's plans submission, MOM's workplace safety and health etc.

GENERAL REQUIREMENTS BEYOND ANNEX A

1. TECHNICAL SPECIFICATIONS

- 1.1 The manufacturer shall ensure that the system / equipment is designed and certified for compliance to the latest applicable International Electrotechnical Commission (IEC) standards (e.g., IEC 60335-2-40) or equivalent established standards (e.g., ISO 5149-1, UL 60335-2-40)
- 1.2 The manufacturer shall ensure that the equipment is tested and certified for compliance to the latest applicable standards. The list of Testing Laboratories through a recognised Certification Body (CB)² is outlined in **Appendix B1**.
- 1.3 For equipment listed in **Annex A**, a Declaration of Conformity shall be filled up by the manufacturer/supplier and submit to SCDF for in-principle approval prior to the sale of equipment. The list of equipment and its model number that has obtained SCDF's in-principle approval can be found on <https://www.scdf.gov.sg/fire-safety-services-listing/downloads/acts-codes-and-regulations>³. The Declaration of Conformity template can be found in **Appendix B2**.

2. ADVISORY LABEL REQUIREMENTS

2.1 Advisory Label for Users

- 2.1.1 The advisory label must be printed and attached as a label or sticker on the front of the equipment displayed at retail premises, ensuring it is clearly visible to potential buyers.
- 2.1.2 Units delivered to a buyer's premises, or any other location specified by the buyer shall have advisory labels affixed to the front of the equipment. Alternative locations on the equipment may be considered, provided that the labels remain clearly visible to the user after installation.
- 2.1.3 The advisory label shall comply with the design specifications outlined in **Appendix B3**⁴. The advisory label shall be at least 90mm (length) by 90mm (breadth). The printed label shall be in an indelible manner and with a minimum resolution of 300 pixels per inch (ppi) as illustrated below.

² Suppliers may consult SCDF if they are unable to find an accepted testing laboratory to obtain a test certificate.

³ For equipment models that have obtained SCDF's in-principle approval, submission of Declaration of Conformity is not required.

⁴ Advisory labels printed prior to the issuance of this circular may still be used. Subsequent advisory labels are to follow requirements stated in the circular.



2.2 Advisory Label for Service Personnel

- 2.2.1 The advisory label to indicate the flammability risks must be permanently affixed near the access area and ensure it remains clearly visible when the casing is removed for maintenance purposes.
- 2.2.2 The advisory label shall be accompanied with a triangular warning sign in accordance with the latest applicable ISO standards (e.g., ISO 7010) for flammable material warning labels. The perpendicular height of the triangular warning sign shall be at least 15mm. The name of the refrigerants (i.e., R32, Difluoromethane and R290, Propane) should also be included along with the triangular warning sign as shown in the sample below.



**Propane
(R-290)**

- 2.2.3 The advisory label shall be accompanied by cautionary statements concerning the associated flammability risks, safe handling, servicing and disposal of the system. The cautionary statements shall be provided in both English and Chinese languages.
- 2.2.4 The advisory label shall comply with the design specifications outlined in **Appendix B3**. The printed label shall be in an indelible manner and with a minimum resolution of 300 pixels per inch (ppi).
- 2.2.5 For existing labels that may contain other advisory messages from the manufacturer, the advisory label outlined in Part 2.2 may be provided either as a standalone label or may be combined with the existing labels.

2.2.6 (**Exception:** The advisory label design specifications outlined in **Appendix B3** may be exempted for systems with existing advisory labels containing similar warning sign and cautionary statements as outlined in Parts 2.2.2 and 2.2.3.)

3. SAFETY CONTROL MEASURES

3.1 Manufacturer/Supplier

- 3.1.1 Any party who imports, transports, or stores flammable refrigerants shall comply with all relevant regulatory requirements from the relevant authorities. This includes obtaining the relevant Petroleum and Flammable Materials license(s)⁵ from the SCDF HazMat Department and complying with the relevant fire safety requirements for buildings.⁶
- 3.1.2 The manufacturer, either directly or through his approved suppliers, shall take all necessary measures as may be deemed reasonable to ensure that service personnel who handle their equipment are competent to work safely with the equipment. They can fulfil this by ensuring that the service personnel have attended relevant competency training. Competency training includes courses conducted by the manufacturer or a third-party training provider accepted by the manufacturer. The training can also be provided through courses accredited by the Singapore Workforce Skills Qualifications (WSQ) system or conducted by a Ministry of Education registered institution (e.g. Institute of Technical Education). The list of trained service personnel or their employers should be made available on the manufacturer and/or supplier website.
- 3.1.3 The manufacturer, either directly or through his approved suppliers, shall take all necessary measures as may be deemed reasonable to educate users on the inherent flammability risks of flammable refrigerants in their equipment and to ensure the safe handling and usage of the equipment.
- 3.1.4 The manufacturer, either directly or through his approved suppliers, shall provide the equipment safety instruction manual to the user to ensure that the user is fully aware of the inherent flammability risks associated with the flammable refrigerants, the essential safety precautions and procedures to adopt. The instruction manual should include a recommended maintenance regime for the equipment in accordance with relevant safety standards and the industry best practices.
- 3.1.5 The manufacturer, either directly or through his approved suppliers, shall offer assistance or services to the user in carrying out installation, maintenance and

⁵ This does not apply to flammable refrigerant contained within equipment.

⁶ SCDF has in-principle no objection to allow operators to store a maximum of 2 numbers of 8kg cylinders of A2L flammable refrigerant licensed by SCDF (e.g. R32) within their factory unit without the need for a fire safety plans submission and storage license. These 2 cylinders shall comply with relevant international safety standards and shall be kept within a metal cabinet with 2.4mm thick metal plate. However, the operator shall ensure that their existing factory layouts with respective usages have obtained the necessary Fire Safety Certificate (FSC). For A3 flammable refrigerant licensed by SCDF, exemption quantity for storage applies.

decommissioning of their system in accordance with the relevant safety standards and industry best practices.

3.2 Service Personnel

3.2.1 Service personnel shall ensure that they are adequately trained before they work with flammable refrigerants and their related equipment.

3.2.2 The employer of the service personnel shall comply with the relevant requirements under the Workplace Safety and Health Act administered by the Ministry of Manpower.

3.3 User

3.3.1 The user shall be advised by the manufacturer, either directly or through his approved suppliers, to ensure strict ignition control regime (e.g., No smoking near equipment) and where practical, eliminate all potential ignition sources (e.g., spark/naked flame) from the equipment placement room.

3.3.2 The user shall be advised by the manufacturer, either directly or through his approved suppliers, to engage trained service personnel to carry out any repair, servicing, or disposal of the equipment.

4. REFERENCES

4.1 Consumer Product Safety Office, Consumer Protection (Safety Requirements) Regulations

4.2 International Electrotechnical Commission (IEC) 60335-2-40 Edition 8 2024-12

4.3 International Electrotechnical Commission (IEC) 60335-2-89 Edition 3 2019-06

4.4 International Organisation for Standardisation (ISO) 817

4.5 United States Environmental Protection Agency – Substitutes in Refrigeration and Air Conditioning

REQUIREMENTS FOR TEST CERTIFICATES

SCDF accepts Test Certificates from Testing Laboratories accredited by ILAC-MRA members or recognised by IECEE.

The list of Recognised Regional Cooperation Bodies by ILAC-MRA includes the following: -

Recognised Regional Cooperation Body	Members of Recognised Regional Cooperation Body
Inter American Accreditation Cooperation (IAAC)	https://iaac.org.mx/members/full-members/
European co-operation for Accreditation (EA)	https://european-accreditation.org/ea-members/directory-of-ea-members-and-mla-signatories/
Asia Pacific Accreditation Cooperation Incorporated (APAC)	https://www.apac-accreditation.org/membership/full-member/
Arab Accreditation Cooperation (ARAC)	https://arabaccreditation.org/arac-members/full-member/
African Accreditation Cooperation (AFRAC)	https://www.intra-afrac.com/Pages/Full-Members.aspx
Southern African Development Community Cooperation in Accreditation (SADCA)	https://www.sadca.org/pages/sadca-members.aspx

More information on ILAC-MRA can be found in the link appended:
<https://ilac.org/ilac-mra-and-signatories/recognised-regional-cooperation-bodies/>

DECLARATION OF CONFORMITY

Section 1 – Equipment

Manufacturer	
Type of equipment	
Model No.	
Name of accredited test lab	
Applicable design standard(s)	

Section 2 – Flammable Refrigerant

Type of flammable refrigerant(s)	
Charge limit of flammable refrigerant(s)	
Is flammable refrigerant hermetically sealed within equipment? (Yes/No)	
If system has more than one (1) circuit containing flammable refrigerant, are the circuit independent of each other? (Yes/No)	

Section 3 – Documentation

To tick <input checked="" type="checkbox"/> if documentation is in order:	
<input type="checkbox"/>	Test certificates (recognised by ILAC-MRA or IECEE)
<input type="checkbox"/>	Safety advisory label for users
<input type="checkbox"/>	Safety advisory label for service personnel

If documents are unavailable, kindly explain why: -

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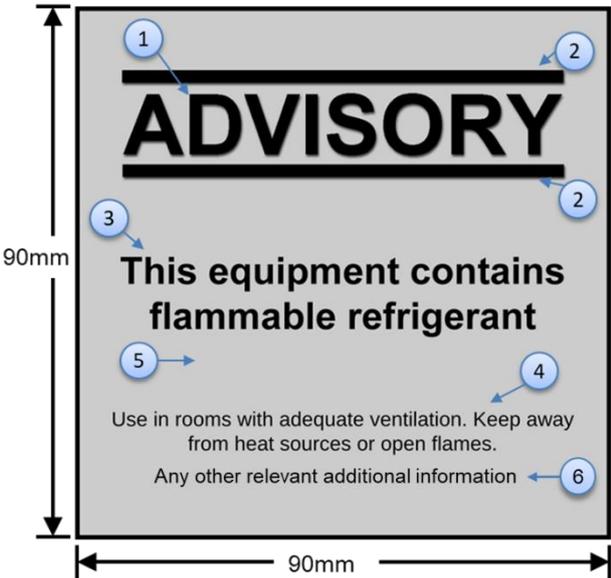
Section 4 – Any other relevant information

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Section 5: Declaration Particulars

Declared By	(Name) (Designation)
Email Address	
Contact Number	
Company	
Date	

FULL DESIGN SPECIFICATIONS FOR ADVISORY LABELS ON FRONT OF EQUIPMENT

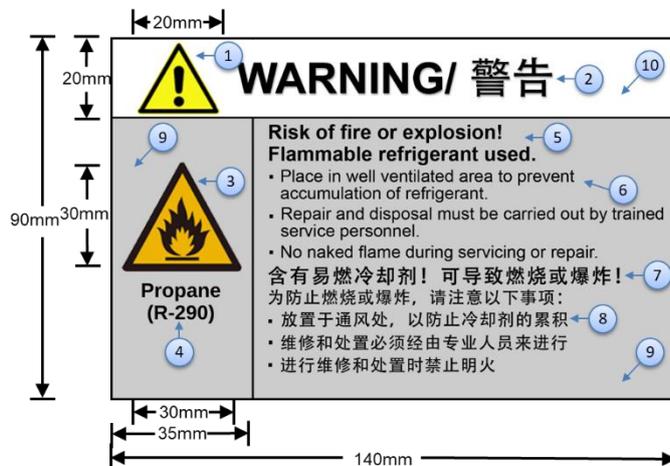


Tag	Description
1	Main cautionary sign. (Arial Black, Bold, Black; Size 40)
2	Two black bars (6 pt thickness) border the cautionary sign.
3	General information statement indicates presence of flammable refrigerant in the equipment. (Arial Black, Bold, Black; Size 18)
4	Safety statement 'Use in rooms with adequate ventilation. Keep away from heat sources or open flames' (Arial Black, Black; Size 10)
5	Background in light grey, (Light Grey; Hex Colour Code #CCCCCC)
6	Any other relevant additional information (e.g.; manufacturer's website) may be inserted here. (Arial Black, Black; Size 10). Otherwise, may leave this blank.

Sample



FULL DESIGN SPECIFICATIONS FOR ADVISORY LABELS FOR SERVICE PERSONNEL AND USERS



Tag	Description
1	Hazard warning symbol in accordance with ISO 7010.
2	Main cautionary sign in English and Chinese. (Arial Black, Bold, Black; Size 28)
3	Flammable material warning symbol in accordance with ISO 7010.
4	Name and refrigerant designation. (Arial Black, Bold, Black; Size 14)
5	Cautionary statement on the risks in English (Arial Black, Bold, Black; Size 14)
6	Safety precautions and advice in English. (Arial Black, Black; Size 12)
7	Cautionary statement on the risks in Chinese. (Adobe Heiti Std, Bold, Black; Size 14)
8	Safety precautions and advice on the risk in Chinese. (Adobe Heiti Std, Bold, Black; Size 12)
9	Background in light grey. (Light Grey; Hex Colour Code #CCCCCC)
10	Background in white. (Light Grey; Hex Colour Code #FFFFFF)

Sample

