

Your Ref :

Our Ref: CD/HAZ/14/03/02/01

Date : 19 September 2016

Attn: Manufacturers / Suppliers / Distributors

Dear Sir/Madam,

**REGULATORY REQUIREMENTS FOR THE USAGE OF R32 REFRIGERANT IN DOMESTIC SPLIT AIR CONDITIONING SYSTEM IN SINGAPORE**

Since our approval of the use of R32 in single-split air conditioning systems in July 2015, SCDF has received requests from the industry to consider allowing the usage of R32 refrigerant in multi-split air conditioning systems. SCDF has subsequently engaged the relevant industry stakeholders to seek clarity on the fire risks, safety standards and the safety control measures on the operations, servicing and disposal of such multi-split air conditioning systems using R32 refrigerant.

2. After careful consideration, SCDF is prepared to allow the usage of R32 refrigerant in both single- and multi-split air conditioning systems, subject to the relevant parties, including but not limited to the manufacturer and his approved suppliers, complying with SCDF's requirements. This circular serves to inform all relevant parties about the requirements to be complied with in order to use R32 refrigerant in split air conditioning systems (Refer to **Annex A** for details). This circular shall take immediate effect and supersedes the circular issued on 13 July 2015 for domestic single-split air conditioning system.

3 Please convey the contents of this circular to the parties concerned. For any inquiry or clarification, please contact CPT Matthew Goh at Tel. No.: 68483323 (e-mail: [Matthew\\_Goh@scdf.gov.sg](mailto:Matthew_Goh@scdf.gov.sg)) or LTC Han Fook Kuang at Tel No.: 68481467 (e-mail: [Han\\_Hook\\_Kuang@scdf.gov.sg](mailto:Han_Hook_Kuang@scdf.gov.sg)).

Yours faithfully,



CPT MATTHEW GOH  
HazMat Department  
for Commissioner  
Singapore Civil Defence Force



**SCDF – A member of the Home Team**

HQ SINGAPORE CIVIL DEFENCE FORCE, 91 UBI AVENUE 4, SINGAPORE  
408827  
TEL: 6848 3323 FAX: 6848 3318

## **1 SCOPE**

This document outlines the conditions for the safe usage of R32 refrigerant in domestic split air conditioning systems. R32 is classified as A2L (lower flammability) in accordance with International Organization for Standardization (ISO) 817:2014.

## **2 DEFINITION**

- 2.1 'Split air conditioning system' –  
Air conditioning system consists of one outdoor unit (condensing unit, CU) and one or more indoor units (fan coil unit, FCU). The outdoor and indoor units are connected by copper pipes and can be located a distance apart.
- 2.2 'Manufacturer' –  
Refers to any party who owns or runs the manufacturing plant that produces the split air conditioning system.
- 2.3 'Supplier' –  
Refers to any party approved by the manufacturer to make the split air conditioning system commercially available to the user in Singapore.
- 2.4 'Service personnel' –  
Refer to technical personnel who are either employed by the manufacturer or his approved suppliers to provide after sale services, including but not limited to, delivery, installation, maintenance, decommissioning and disposal of the split air conditioning system.
- 2.5 'User' –  
Refers to any party who owns and/or oversees the day-to-day operation of the split air conditioning system and carries out a general duty of care for it.
- 2.6 'Equipment placement room' –  
Refers to a compartmentalized area or room in which the indoor unit is placed by the user for its intended usage.
- 2.7 'LFL' –  
Refers to the Lower Flammability Limit, which is the lower end of the concentration range over which a flammable mixture of gas or vapour in air can be ignited at a given temperature and pressure.

## **3 SAFETY REQUIREMENTS**

### **3.1 General Safety Requirements**

- 3.1.1 Manufacturer shall ensure that the split air conditioning system (hereinafter referred to as "equipment") complies with the latest applicable International Electrotechnical Commission (IEC) standards (eg. IEC 60335-2-40) and International Organization for Standardization (ISO) standards (eg. ISO 5149-1-4) for air conditioning systems. The equipment shall also be regulated by SPRING under the Consumer Protection (Consumer Goods Safety Requirements) Regulations (CGSR).
- 3.1.2 Manufacturer, either directly or through his approved suppliers, shall ensure that R32 refrigerant is only used in new equipment designed specifically for the refrigerant.
- 3.1.3 Any party who imports, transports, stores and/or works with R32 refrigerant shall comply with all relevant regulatory requirements from the respective government agencies. This includes obtaining a storage license from the SCDF Central Enforcement Department and complying

with fire safety requirements which may require a plan submission<sup>1</sup> by a Qualified Person (QP) follow by Registered Inspector (RI) inspection to obtain the Fire Safety Certificate (FSC).

**3.2 Safety Awareness**

3.2.1 Manufacturer, either directly or through his approved suppliers, shall take all necessary measures as may be deemed reasonable to educate users on the inherent safety risks from the usage of R32 refrigerant in the equipment and to ensure the safe handling and usage of the equipment. These measures shall include, but are not limited to, those outlined under Parts 4 and 5 of this document.

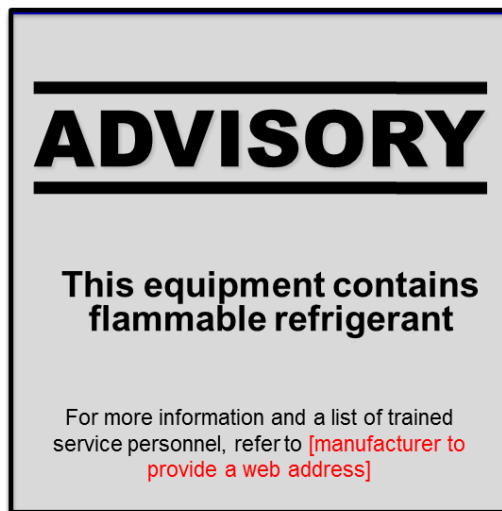
**4 ADVISORY LABEL REQUIRMENTS**

**4.1 Advisory Label for Users**

4.1.1 The advisory label shall be printed or affixed as a label/sticker on the front of the FCU on display at retail premises and shall be clearly visible to potential buyers when viewing the equipment.

4.1.2 For units delivered to a buyer's premises or any other location as determined by the buyer, the advisory label shall also be affixed on the front of the FCU.

4.1.3 The advisory label shall comply with the design specifications outlined in **Appendix A1**. The advisory label shall be 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). An example is illustrated below.



**4.2 Advisory Label for Service Personnel**

4.2.1 The advisory label shall be affixed permanently on or near the condensing unit of the system to indicate the flammability risks. The advisory label shall be clearly visible from the repair access area.

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<sup>1</sup> SCDF has in-principle no objection to allow individual operators to store a maximum of 2 numbers of 8kg cylinders of R32 within their factory unit without the need for a fire safety plans submission. These 2 gas cylinders shall comply with relevant international safety standards and shall be kept within a metal cabinet with 2.4mm thick metal plate. However, the individual operator shall ensure their existing factory layouts with respective usages have obtained the necessary FSC (Fire Safety Certificate).

- 4.2.2 The advisory label shall also be affixed permanently on the side of the FCU casing which shall be clearly visible when removing the casing for maintenance.
- 4.2.3 The advisory label shall be accompanied with a triangular warning sign in accordance to 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 refrigerant (i.e. R32, Difluoromethane) should also be included together with the triangular warning sign as shown in the sample below.



**Difluoromethane  
(R-32)**

- 4.2.4 The advisory label shall be accompanied with cautionary statements concerning the flammability risks, safe handling, servicing and disposal of the system. The cautionary statements shall be provided in both English and Chinese languages.
- 4.2.5 The advisory label shall comply with the design specifications outlined in **Appendix A2**. The printed label shall be in an indelible manner and with a minimum resolution of 300 pixels per inch (ppi).
- 4.2.6 For existing labels which may contain other advisory messages from the manufacturer, the advisory label outlined in Part 4.2 may be provided either as a standalone label or may be combined with the existing labels.

**(Exception:** The advisory label design specifications outlined in Appendix A2 may be exempted for systems with existing advisory labels containing similar warning sign and cautionary statements as outlined in Part 4.2.3 and 4.2.4.)

## **5 SAFETY CONTROL MEASURES**

### **5.1 Manufacturer/Supplier**

- 5.1.1 Manufacturer shall take all necessary measures as may be deemed reasonable to ensure that service personnel, either employed by him or his approved suppliers, who handles the equipment, are equipped with all the relevant technical skills to work safely with the equipment. Manufacturer may fulfil this either by providing the training or leveraging on training provided by a third party (e.g. another manufacturer). The training provided shall either be accredited by the Singapore Workforce Skills Qualifications (WSQ) system or be conducted by a Ministry of Education registered institution (e.g. Institute of Technical Education). The list of trained service personnel and their employers shall be displayed on the respective manufacturer's website and the web address shall be printed on the advisory label as shown in **Appendix A1**.
- 5.1.2 Both the manufacturer and supplier of the equipment shall ensure that before installing the equipment, the service personnel conduct the necessary risk assessment and evaluation of the size of the equipment placement room and the maximum refrigerant charge in accordance to IEC 60335-2-40.

5.1.3 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 safety risks posed by the R32 refrigerant and the essential safety precautions and procedures are adopted. The instruction manual should include a recommended maintenance regime for the equipment in accordance to relevant safety standards and industry best practices.

5.1.4 Manufacturer, either directly or through his approved suppliers, shall offer assistance/services to the user in carrying out installation, maintenance and decommissioning of the system in accordance to the relevant safety standards and industry best practices.

5.2 Service Personnel

5.2.1 Employer of service personnel shall ensure that they are adequately trained by the recognised training providers (refer to 5.1.1) before they work with R32 refrigerant and its related equipment.

5.2.2 Employer of the service personnel shall ensure that they are adequately trained to conduct the necessary risk assessment and evaluation of the size of the equipment placement room and the maximum refrigerant charge in accordance to IEC 60335-2-40.

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

5.3 User

5.3.1 User shall be advised by the manufacturer, either directly or through his approved suppliers, to impose strict ignition control regime (e.g. "No Smoking" policy) and where practical, eliminate all potential ignition sources (eg. spark/naked flame) from the equipment placement room.

5.3.2 User shall be advised by the manufacturer, either directly or through his approved suppliers, to engage service personnel trained by the recognised training providers (refer to 5.1.1) to carry out any delivery, installation, maintenance, decommissioning or disposal of the system.

**6 REFERENCES**

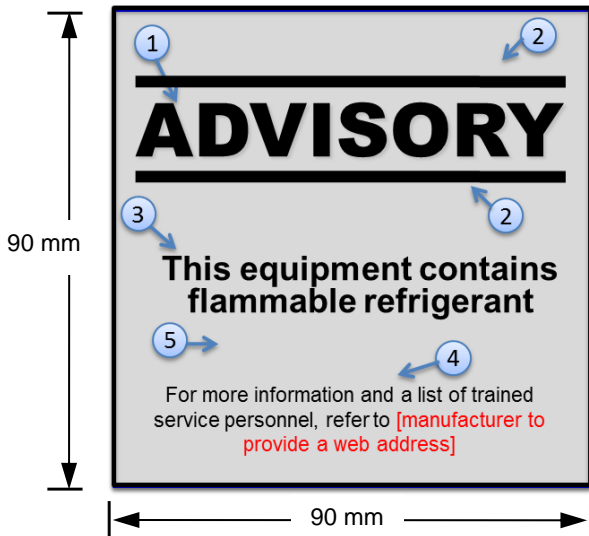
6.1 International Electrotechnical Commission (IEC) 60335-2-40 standard

6.2 International Organization for Standardization (ISO) 817 standard

6.3 International Organization for Standardization (ISO) 5149-1-4 standard

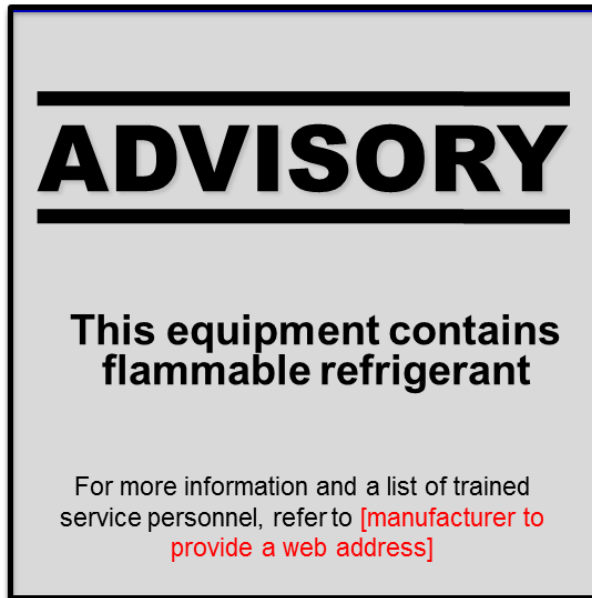
6.4 Consumer Protection (Consumer Goods Safety Requirements) Regulations 2011 Information Booklet by SPRING Singapore

Full Design Specifications for Advisory Label on the Front of Indoor Unit



Tag	Description
1	Main Cautionary Sign. (Arial Black, Bold, Black; Size 40)
2	Two black bars (6 pt thickness) to border the cautionary sign.
3	A general information statement to indicate the presence of flammable refrigerant in the equipment. (Arial, Bold, Black; Size 18)
4	More information available. (Arial, Black; Size 10)
5	The background color to be light grey. (color code #CCCCCC)

Sample



Full Design Specifications for Advisory Label for Service Personnel



Tag	Description
1	Hazard warning symbol in accordance to applicable ISO standard. (eg. ISO 7010)
2	Main cautionary sign in English and Chinese languages. (Arial Black, Bold, Black; Size 28)
3	Flammable material warning symbol in accordance to applicable ISO standard. (eg. ISO 7010)
4	The type of refrigerant is specified here. (Arial, Bold, Black; Size 11)
5	Cautionary statement on the use of flammable refrigerant is specified here. (Arial, Bold, Black; Size 14)
6	The safety precaution and advice are specified here. (Arial, Black; Size 12)
7	Cautionary statement translated in Chinese. (Adobe Heiti Std, Bold, Black; Size 14)
8	Safety precaution and advice translated in Chinese. (Adobe Heiti Std, Black; Size 12)
9	The background color to be light grey (color code #CCCCCC).
10	The background to be in white (color code #FFFFFF).

Sample



Your Ref :

Our Ref: CD/HAZ/14/03/02/01

Date : 13 July 2015

Attn: Manufacturers / Suppliers / Distributors

Dear Sir/Madam,

**REGULATORY REQUIREMENTS FOR THE USAGE OF R32 REFRIGERANT IN DOMESTIC SINGLE-SPLIT AIR CONDITIONING SYSTEM IN SINGAPORE**

Since November 2013, SCDF have received requests from the industry to consider allowing the usage of R32 refrigerant in single-split air conditioning systems. SCDF subsequently engaged the relevant industry stakeholders to seek clarity on the fire risks, safety standards and the safety control measures on the operations, servicing and disposal of such single-split air conditioning systems using R32 refrigerant.

2. After careful consideration, SCDF is prepared to allow the usage of R32 refrigerant in single-split air conditioning systems, subject to the relevant parties, including but not limited to the manufacturer and his approved suppliers, complying with SCDF's requirements. This circular serves to inform all relevant parties about the requirements to be complied with in order to allow the usage of R32 refrigerant in single-split air conditioning systems (Refer to **Annex A** for details). This circular shall take immediate effect.

3 Please convey the contents of this circular to the parties concerned. For any inquiry or clarification, please contact CPT Matthew Goh at Tel. No.: 68483323 (e-mail: [Matthew\\_Goh@scdf.gov.sg](mailto:Matthew_Goh@scdf.gov.sg)) or LTC Han Fook Kuang at Tel No.: 68481467 (e-mail: [Han\\_Hook\\_Kuang@scdf.gov.sg](mailto:Han_Hook_Kuang@scdf.gov.sg)).

Yours faithfully,



CPT MATTHEW GOH  
HazMat Department  
for Commissioner  
Singapore Civil Defence Force



**SCDF – A member of the Home Team**

HQ SINGAPORE CIVIL DEFENCE FORCE, 91 UBI AVENUE 4, SINGAPORE  
408827  
TEL: 6848 3323 FAX: 6848 3318



## **1 SCOPE**

This document outlines the conditions for the safe usage of R32 refrigerant in domestic single-split air conditioning system. R32 is classified as A2L (lower flammability) in accordance with International Organization for Standardization (ISO) 817:2014.

## **2 DEFINITION**

- 2.1 'Single-split air conditioning system' –  
Air conditioning system consists of two units; one outdoor unit (condensing unit, CU) and one indoor unit (fan coil unit, FCU). Both units are connected by copper pipes and can be located a distance apart.
- 2.2 'Manufacturer' –  
Refers to any party who owns or runs the manufacturing plant that produces the single-split air conditioning system.
- 2.3 'Supplier' –  
Refers to any party approved by the manufacturer to make the single-split air conditioning system commercially available to the user in Singapore.
- 2.4 'Service personnel' –  
Refer to technical personnel who are either employed by the manufacturer or his approved suppliers to provide after sale services, including but not limited to, delivery, installation, maintenance, decommissioning and disposal of the single-split air conditioning system.
- 2.5 'User' –  
Refers to any party who owns and/or oversees the day-to-day operation of the single-split air conditioning system and carries out a general duty of care for it.
- 2.6 'Equipment placement room' –  
Refers to a compartmentalized area or room in which the indoor unit is placed by the user for its intended usage.

## **3 SAFETY REQUIREMENTS**

### **3.1 General Safety Requirements**

- 3.1.1 Manufacturer shall ensure that the single-split air conditioning system (hereinafter referred to as "equipment") complies with the latest applicable International Electrotechnical Commission (IEC) standards (eg. IEC 60335-2-40) and International Organization for Standardization (ISO) standards (eg. 5149-1-4:2014) for air conditioning systems. The equipment shall also be regulated by SPRING under the Consumer Protection (Consumer Goods Safety Requirements) Regulations (CGSR).
- 3.1.2 Manufacturer shall ensure that the equipment does not carry more than 1.8 kilograms of refrigerant per system. Manufacturer shall ensure that the equipment is designed to contain below the maximum charge size while remaining consistent with the intended cooling capacity and would not result in a concentration of refrigerant that exceeds the practical limit of R32 in the event of a leak.
- 3.1.3 Manufacturer, either directly or through his approved suppliers, shall ensure that R32 refrigerant is only used in new equipment designed specifically for the refrigerant.
- 3.1.4 Any party who imports, transports, stores and/or works with R32 refrigerant shall comply with all relevant regulatory requirements from the respective government agencies. This includes obtaining a storage license from the SCDF Central Enforcement Department.

3.2 Safety Awareness

3.2.1 Manufacturer, either directly or through his approved suppliers, shall take all necessary measures as may be deemed reasonable to educate users on the inherent safety risks from the usage of R32 refrigerant in the equipment and to ensure the safe handling and usage of the equipment. These measures shall include, but are not limited to, those outlined under Parts 4 and 5 of this document.

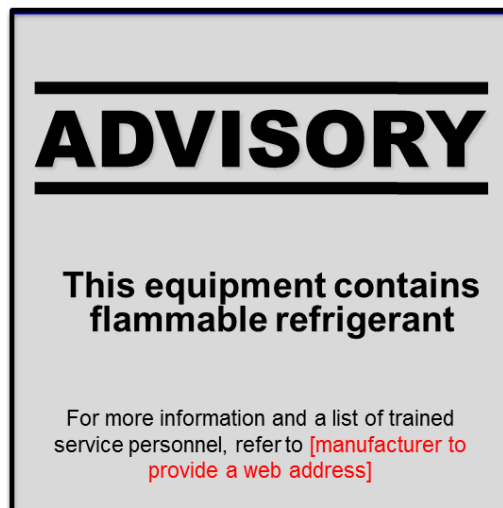
**4 ADVISORY LABEL REQUIRMENTS**

4.1 Advisory Label for Users

4.1.1 The advisory label shall be printed or affixed permanently on the front of the FCU on display at retail premises and shall be clearly visible to potential buyers when viewing the equipment.

4.1.2 For units delivered to a buyer's premises or any other location as determined by the buyer, the advisory label shall also be affixed on the front of the FCU.

4.1.3 The advisory label shall comply with the design specifications outlined in **Appendix A1**. The advisory label shall be 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). An example is illustrated below.



4.2 Advisory Label for Service Personnel

4.2.1 The advisory label shall be affixed permanently on or near the condensing unit of the system to indicate the flammability risks. The advisory label shall be clearly visible from the repair access area.

4.2.2 The advisory label shall also be affixed permanently on the side of the FCU casing which shall be clearly visible when removing the casing for maintenance.

4.2.3 The advisory label shall be accompanied with a triangular warning sign in accordance to 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 refrigerant (i.e. R32, Difluoromethane) should also be included together with the triangular warning sign as shown in the sample below.



**Difluoromethane  
(R-32)**

- 4.2.4 The advisory label shall be accompanied with cautionary statements concerning the flammability risks, safe handling, servicing and disposal of the system. The cautionary statements shall be provided in both English and Chinese languages.
- 4.2.5 The advisory label shall comply with the design specifications outlined in **Appendix A2**. The printed label shall be in an indelible manner and with a minimum resolution of 300 pixels per inch (ppi).
- 4.2.6 For existing labels which may contain other advisory messages from the manufacturer, the advisory label outlined in Part 4.2 may be provided either as a standalone label or may be combined with the existing labels.

**(Exception:** The advisory label design specifications outlined in Appendix A2 may be exempted for systems with existing advisory labels containing similar warning sign and cautionary statements as outlined in Part 4.2.3 and 4.2.4.)

## **5 SAFETY CONTROL MEASURES**

### **5.1 Manufacturer/Supplier**

- 5.1.1 Manufacturer shall take all necessary measures as may be deemed reasonable to ensure that service personnel, either employed by him or his approved suppliers, who handles the equipment, are equipped with all the relevant technical skills to work safely with the equipment. Manufacturer may fulfil this either by providing the training or leveraging on training provided by a third party (eg. another manufacturer). The training provided shall either be accredited by the Singapore Workforce Skills Qualifications (WSQ) system or be conducted by a Ministry of Education registered institution (e.g. Institute of Technical Education). The list of trained service personnel and their employers shall be displayed on the respective manufacturer's website and the web address shall be printed on the advisory label as shown in **Appendix A1**.
- 5.1.2 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 safety risks posed by the R32 refrigerant and the essential safety precautions and procedures are adopted. The instruction manual should include a recommended maintenance regime for the equipment in accordance to relevant safety standards and industry best practices.
- 5.1.3 Manufacturer, either directly or through his approved suppliers, shall offer assistance/services to the user in carrying out installation, maintenance and decommissioning of the system in accordance to the relevant safety standards and industry best practices.

### **5.2 Service Personnel**

- 5.2.1 Employer of service personnel shall ensure that they are adequately trained by the recognised training providers (refer to 5.1.1) before they work with R32 refrigerant and its related equipment.

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

5.3 User

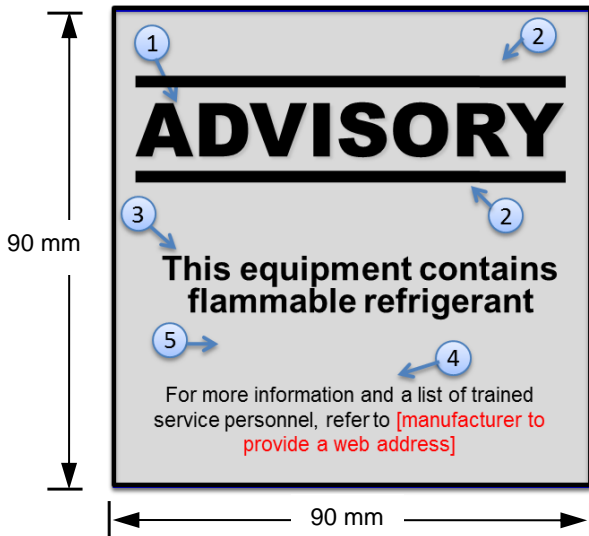
5.3.1 User shall be advised by the manufacturer, either directly or through his approved suppliers, to impose strict ignition control regime (e.g. "No Smoking" policy) and where practical, eliminate all potential ignition sources (eg. spark/naked flame) from the equipment placement room.

5.3.2 User shall be advised by the manufacturer, either directly or through his approved suppliers, to engage service personnel trained by the recognised training providers (refer to 5.1.1) to carry out any delivery, installation, maintenance, decommissioning or disposal of the system.

**6 REFERENCES**

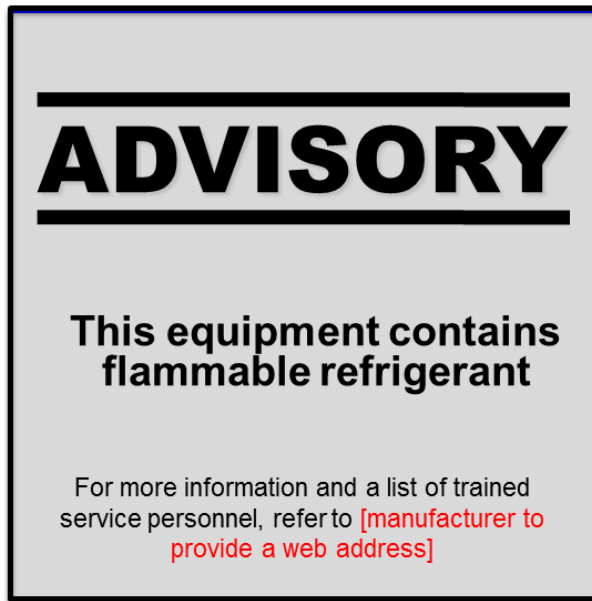
- 6.1 International Electrotechnical Commission (IEC) 60335-2-40 standard
- 6.2 International Organization for Standardization (ISO) 817:2014 standard
- 6.3 International Organization for Standardization (ISO) 5149-1-4:2014 standard
- 6.4 Consumer Protection (Consumer Goods Safety Requirements) Regulations 2011 Information Booklet (Edition 1.3) by SPRING Singapore

Full Design Specifications for Advisory Label on the Front of Indoor Unit



Tag	Description
1	Main Cautionary Sign. (Arial Black, Bold, Black; Size 40)
2	Two black bars (6 pt thickness) to border the cautionary sign.
3	A general information statement to indicate the presence of flammable refrigerant in the equipment. (Arial, Bold, Black; Size 18)
4	More information available. (Arial, Black; Size 10)
5	The background color to be light grey. (color code #CCCCCC)

Sample



Full Design Specifications for Advisory Label for Service Personnel



Tag	Description
1	Hazard warning symbol in accordance to applicable ISO standard. (eg. ISO 7010)
2	Main cautionary sign in English and Chinese languages. (Arial Black, Bold, Black; Size 28)
3	Flammable material warning symbol in accordance to applicable ISO standard. (eg. ISO 7010)
4	The type of refrigerant is specified here. (Arial, Bold, Black; Size 11)
5	Cautionary statement on the use of flammable refrigerant is specified here. (Arial, Bold, Black; Size 14)
6	The safety precaution and advice are specified here. (Arial, Black; Size 12)
7	Cautionary statement translated in Chinese. (Adobe Heiti Std, Bold, Black; Size 14)
8	Safety precaution and advice translated in Chinese. (Adobe Heiti Std, Black; Size 12)
9	The background color to be light grey (color code #CCCCCC).
10	The background to be in white (color code #FFFFFF).

Sample

