

# **Overview of the Refrigeration Safety Ordinance**

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## Overview of the Refrigeration Safety Ordinance

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## 1. Introduction

### 1-1. Refrigeration

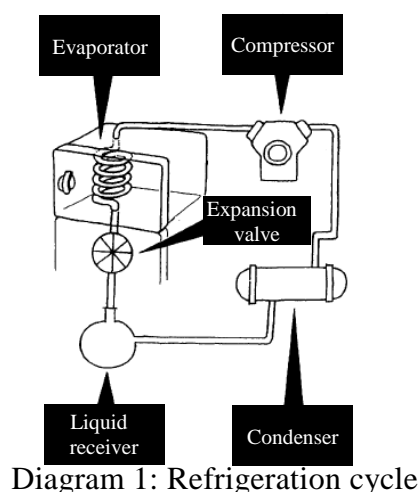
In the context of the High Pressure Gas Safety Act, “refrigeration” means refrigeration, ice making and other freezing, cooling, air-conditioning or air-heating with the use of a refrigeration equipment and calefaction. (Article 5 of the Act<sup>\*1</sup>, Circular Notices (Internal Rules))

Today, refrigeration equipment is used in a variety of fields, such as storage and transport of food, the chemical industry, medicine, and so on. In addition, refrigeration equipment is used for creating comfortable living space as air-conditioning equipment.

### 1-2. Background of the Establishment of the Refrigeration Safety Ordinance

The Refrigeration Ordinance was established to cover the aspect of refrigeration when the Ordinance for Enforcement of the High Pressure Gas Control Law was divided into different Ordinances targeting different aspects of high pressure gas handling in 1966. This division was based on the idea that high pressure gas is handled differently depending on the domains which use high pressure gas and that ordinance appropriate for each circumstances are necessary.

The reason that refrigeration is classified separately from other business categories is that refrigeration is a simple process in a so-called closed cycle, in which the circulation of refrigerant gas is repeated, as shown in Diagram 1. For this reason, the risk per amount of compression (production) is considered to be lower compared to other types of high pressure gas production.



\*1 The following abbreviations may be used in this document:

- The Act: The High Pressure Gas Safety Act
- The Cabinet Order: The Order for Enforcement of the High Pressure Gas Safety Act
- The Refrigeration Ordinance: The Refrigeration Safety Ordinance
- Circular Notices (Internal Rules): Application and Interpretation of the High Pressure Gas Safety Act and the relevant Ministerial Ordinances (Internal Rules)

## 2. Overview of the Refrigeration Safety Ordinance

### 2-1. Basic Framework of the Refrigeration Safety Ordinance

The Refrigeration Ordinance was prescribed by the Minister of Economy, Trade and Industry as a way of executing the High Pressure Gas Safety Act. It contains the matters required to be stipulated by the Act. The Refrigeration Ordinance provides calculation methods of refrigerating capacity, various administrative procedures, technical standards for various handlings, and so forth.

The provisions in the Refrigeration Ordinance are arranged in Chapters and Sections for each type of high pressure gas handling (production, storage, sale, import and disposal) and for each type of equipment for high pressure gas uses (Specified Equipment and apparatuses). In addition, separate Chapters and Sections are dedicated for voluntary safety measures and various inspections. An overview of the main Chapters and Sections is explained hereafter.

### 2-2. Permission, etc. for Production of High Pressure Gas (Chapter II, Section 1 of the Refrigeration Ordinance)

#### (1) Definitions of Terms

The contents of the ordinance differ depending on the types of refrigerant gas and refrigerating capacities.

The Refrigeration Ordinance provides specific names of flammable, toxic, and inert gases, as listed in Table 1. (Article 2 of the Refrigeration Ordinance)

Table 1: Definitions of types of gases

Flammable gases	Ammonia, isobutane, ethane, ethylene, chloromethyl, hydrogen, normal butane, propane, and propylene
Toxic gases	Ammonia and chloromethyl
Inert gas	Carbon dioxide, fluorocarbon 12, fluorocarbon 13, fluorocarbon 13B1, fluorocarbon 22, fluorocarbon 114, fluorocarbon 116, fluorocarbon 124, fluorocarbon 125, fluorocarbon 134a, fluorocarbon 401A, fluorocarbon 401B, fluorocarbon 402A, fluorocarbon 402B, fluorocarbon 404A, fluorocarbon 407A, fluorocarbon 407B, fluorocarbon 407C, fluorocarbon 407D, fluorocarbon 407E, fluorocarbon 410A, fluorocarbon 410B, fluorocarbon 413A, fluorocarbon 417A, fluorocarbon 422A, fluorocarbon 422D, fluorocarbon 423A, fluorocarbon 500, fluorocarbon 502, Fluorocarbon 507A, fluorocarbon 509A, and helium

Refrigerating capacity is a value expressing the scale of refrigeration equipment and refers to a processing capacity, normally per day (24 hours).

Specifically, a piece of equipment which is capable of removing the amount of heat required to convert 1 ton of water at 0°C into 1 ton of ice at 0°C in 24 hours is said to have a refrigeration capacity of 1 ton per day.

The specific calculation methods of refrigerating capacity are provided in Article 5 of the Refrigeration Ordinance, according to the types of refrigeration equipment.

For example, it is prescribed that in terms of the daily refrigerating capacity of a piece of production equipment, which uses a centrifugal compressor, for air conditioning, etc. of a large building, the rated output of the motor for said compressor is calculated as 1.2 kW per ton of refrigeration.

Alternatively, the daily refrigerating capacity of a piece of production equipment, which uses a rotary compressor, for a room air conditioner and refrigerator, etc., is to be determined by the following formula:

$$R = V/C$$

R: Daily refrigerating capacity (ton)

V: Piston displacement per hour at a standard rotational speed of compressor (m<sup>3</sup>)

C: Value specified according to the type of refrigerant gas

- (2) Classification of the applicable technical standards for production of high pressure gas  
Table 2 shows the classification of the applicable technical standards for production of high pressure gas.

Table 2: Classification of the applicable technical standards

Refrigerant gases→	Inert fluorocarbons		Fluorocarbons other than inert ones and ammonia	Others
	Other than Specified Equipment	Specified Equipment		
Refrigeration equipment →				
Class 1 Producer	50 tons or more	-	50 tons or more	20 tons or more
Class 2 Producer	20 tons or more and less than 50 tons	50 tons or more	5 tons or more and less than 50 tons	3 tons or more and less than 20 tons
Other Productions	5 tons or more and less than 20 tons	-	3 tons or more and less than 5 tons	-
Exclusion from Application	Less than 5 tons	-	Less than 3 tons	Less than 3 tons

\* “Specified Equipment” mentioned in Table 2 is explained in 9. below.

Any person who falls under the category of “Class 1 Producer” in Table 2 is subject to the following ordinance:

- A Class 1 Producer shall obtain the permission for production by the prefectural governor for each plant;
- The location, construction, and equipment of the facilities for production shall be in conformity with the technical standards provided for in Articles 7 and 8 of the Refrigeration Ordinance; and
- The methods of production shall be in conformity with the technical standards provided for in Article 9 of the Refrigeration Ordinance.

Any person who falls under the category of “Class 2 Producer” in Table 2 is subject to the following ordinance:

- A Class 2 Producer shall submit a notification report for production to the prefectural governor for each plant;

- The location, construction, and equipment of the facilities for production shall be in conformity with the technical standards provided for in Articles 12 and 13 of the Refrigeration Ordinance; and
- High pressure gas shall be produced in accordance with the technical standards provided for in Article 14 of the Refrigeration Ordinance.

Any person who falls under the category of “Other Productions” in Table 2 is subject to the following ordinance:

- High pressure gas shall be produced in accordance with the technical standards provided for in Article 15 of the Refrigeration Ordinance.

Any person who falls under the category of “Exclusion from Application” in Table 2 is not subject to the ordinance of the Act.

With respect to the application of the Refrigeration Ordinance, a “plant” is a place in which a piece of equipment considered to be a single piece of refrigeration equipment is installed; therefore, the permission shall be applied or the notification shall be submitted for each piece of refrigeration equipment.

In this case, the following are considered “a single piece of refrigeration equipment” in addition to those that are obviously single pieces of refrigeration equipment. Pieces of refrigeration equipment which share a refrigerant gas through pipes;

- Two or more equipment with separate refrigerant systems which are incorporated in what is generally accepted as a single standard product (a product which has a refrigerant equipment and a compressor motor assembled in a single frame at a production plant of Apparatus Manufacturer and other products of a similar kind);
- Refrigeration equipment using a binary or greater refrigeration system; and
- Pieces of refrigeration equipment which share power generation equipment for a compressor such as a motor.

Furthermore, two or more pieces of refrigeration equipment which share the same brine are considered a single piece of refrigeration equipment.

In this way, the number of pieces of equipment determines the number of plants in terms of refrigeration, even when there is only a single plant from the financial point of view (Circular Notices (Internal Rules)).

As of end of March 2012, there are 7,500 Class 1 Producers and 65,300 Class 2 Producers.

### (3) Technical standards concerning location, construction, and equipment of the facilities for production

The technical standards concerning the location, construction, and equipment of the facilities for production are provided for in Articles 7, 8, 12, and 13 of the Refrigeration Ordinance. The different items of the technical standards are applicable for Class 1 Producers and Class 2 Producers as well as for stationary and mobile production equipment. Table 3 and Table 4 summarize the items applicable for each producer and production equipment.

Any person who has been given permission as a Class 1 Producer shall subject each of his/her production facilities to a completion inspection by the prefecture and shall not use them until they are found to be in conformity with the technical standards; provided, however, that this shall not apply to the case where said person has subjected the facilities for the production of high pressure gas to a completion inspection by the High Pressure Gas Safety Institute of Japan or an agency designated by the Minister of Economy, Trade and Industry (hereinafter referred to as “Designated Completion Conformity Inspection Body”), has received approval that said facilities are in conformity with the technical standards, and has notified such approval to the prefectural governor. (Article 20, paragraph (1) of the Act)

Table 3: Applicable items of the technical standards concerning location, construction, and equipment of the facilities for production  
(Class 1 Producers)

*1 No.	Technical Standards	Class 1 Producers							
		Stationary production equipment (Article 7 of the Refrigeration Regulations)					Mobile production equipment (Article 8 of the Refrigeration Regulations)		
		Except Specified Equipment				Specified Equipment			
		All	Flammable	Toxic	Inert	Inert	All	Flammable	Toxic
1	Distance to flammable and combustible substances	○				○	○		
1	Distance to place where fire is used	○				○			
2	Warning signs	○				○	○		
3	Construction to prevent gas build-up		○	○				○	○
4	Vibration, impact, corrosion, etc.	○				○	○		
5	Seismic resistant design	○							
6	Leakage test and pressure-proof test	○				○	○		
7	Pressure gauge	○				○	○		
8	Safety devices	○				○	○		
9	Position of the discharge pipe opening		○*2	○*2					
9-2	Standards for ammonia absorption refrigerators		○	○					
10	Type of level gauge		○	○			○	○	
11	Breakage prevention of level gauge	○				○	○		
11	Prevention of leaks caused by breakage of level gauge		○	○			○	○	
12	Fire extinguishing equipment		○				○		
13	Spillage prevention			○					
14	Explosion-proofing of electrical equipment		○*3						
15	Detection and alarm equipment		○*2	○*2					
16	Abatement device			○*2					
17	Operation of valves and cocks	○				○			

\*1 Numbers according to the items under paragraph (1) of Article 7 of the Refrigeration Ordinance

\*2 Except ammonia absorption refrigerators

\*3 Except ammonia



Table 4: Applicable items of the technical standards concerning location, construction, and equipment of the facilities for production (Class 2 Producers)

*1 No.	Technical Standards	Class 2 Producers								
		Stationary production equipment (Article 12 of the Refrigeration Regulations)					Mobile production equipment (Article 13 of the Refrigeration Regulations)			
		Except Specified Equipment				Specified Equipment				
		All	Flammable	Toxic	Inert	Inert	All	Flammable	Toxic	Inert
1	Distance to flammable and combustible substances	○				○	○			
1	Distance to place where fire is used	○				○				
2	Warning signs	○				○	○			
3	Construction to prevent gas build-up		○	○				○	○	
4	Vibration, impact, corrosion, etc.	○				○	○			
5	Seismic resistant design									
6	Leakage test and pressure-proof test	○				○	○			
7	Pressure gauge					○				
8	Safety devices	○				○	○			
9	Position of the discharge pipe opening		○*2	○*2						
9-2	Standards for ammonia absorption refrigerators		○	○						
10	Type of level gauge		○	○				○	○	
11	Breakage prevention of level gauge	○				○	○			
11	Prevention of leaks caused by breakage of level gauge		○	○				○	○	
12	Fire extinguishing equipment		○					○		
13	Spillage prevention									
14	Explosion-proofing of electrical equipment		○*3							
15	Detection and alarm equipment		○*2	○*2						
16	Abatement device			○*2						
17	Operation of valves and cocks	○				○				

\*1 Numbers according to the items under paragraph (1) of Article 7 of the Refrigeration Ordinance

\*2 Except ammonia absorption refrigerators

\*3 Except ammonia

Refer to 3-1. under “Supplement” for details of the technical standards in Table 3 and Table 4.

Mobile production equipment mentioned in Table 3 and Table 4 is production equipment of high pressure gas which is transportable on the ground, whereas stationary production equipment refers to production equipment other than the mobile production equipment (Article 2, paragraph (1) of the Refrigeration Ordinance).

Examples of mobile production equipment include cool air blowers for aircraft utilized in the airports, automobile air-conditioners, cab coolers, refrigerated vehicles, etc.

(4) Technical standards concerning methods of production

The technical standards of production methods are provided for in Articles 9, 14, and 15 of the Refrigeration Ordinance.

The different items of the technical standards are applicable for Class 1 Producers, Class 2 Producers, and other productions.

Table 5 summarizes the items applicable for each category of producers.

Technical Standards	Class 1 Producers (Article 9 of the Refrigeration Regulations)				Class 2 Producers (Article 14 of the Refrigeration Regulations)					Other Productions (Article 15 of the Refrigeration Regulations)
					Except Specified Equipment				Specified Equipment	
	All	Flammable	Toxic	Inert	All	Flammable	Toxic	Inert	Inert	
Stop valves for safety valves	○				○				○	
Daily inspection of the production facilities	○				○				○	
Repair and cleaning methods, etc.										
a. Work plan and person in charge for repair and cleaning	○				○				○	
b. Repair and cleaning of refrigeration equipment with flammable or toxic gas		○	○			○	○			
c. In case where refrigerant equipment is overhauled for repair and cleaning	○				○				○	
d. After completing the repair and cleaning	○				○				○	
Operation of valves	○				○				○	
Test operation or leakage test after installation or alternation works					○				○	○

Table 5: Technical standards of production methods

Refer to 3-2. under “Supplement” for details of the technical standards in Table 5.

### 2-3. Technical Standards for Storage of High Pressure Gas (Chapter II, Section 2 of the Refrigeration Ordinance)

With respect to the Refrigeration Ordinance, storage of high pressure gas means to place refrigeration equipment, containing refrigerant gas, with a daily refrigeration capacity of 20 tons or more (50 tons or more in case where the high pressure gas inside the refrigeration equipment is a fluorocarbon or ammonia) at a storefront or in a warehouse, that is not for the purpose of production.

In particular, inventory of air conditioners, etc., falls under such storage (Article 20 of the Refrigeration Ordinance; Circular Notices (Internal Rules)).

The technical standard for storage of refrigerant is as follows:

- Refrigeration equipment shall have impact protection measures in place and shall not be handled roughly.

### 2-4. Notification, etc., of Sales Business of High Pressure Gas (Chapter III of the Refrigeration Ordinance)

With respect to the Refrigeration Ordinance, sale of high pressure gas means to sell a high pressure gas contained in refrigeration equipment with a daily refrigeration capacity of 20 tons or more (50 tons or more in case where the high pressure gas inside the refrigeration equipment is a fluorocarbon or ammonia) (Article 26 of the Refrigeration Ordinance; Circular Notices (Internal Rules)).

The ordinances concerning the sales are as follows:

- Notification of sales business;
- Condition, etc., of refrigerant equipment:  
Refrigerant equipment shall be free of corrosion, cracks, lines, creases, etc., and shall have no leakages of refrigerant gas;
- Storage methods:  
Refrigeration equipment shall have impact protection measures in place and shall not be handled roughly; and
- Safety records of the places where high pressure gas has been delivered shall be kept.

## 2-5. Inspection, etc., for Import of High Pressure Gas (Chapter V of the Refrigeration Ordinance)

With respect to the Refrigeration Ordinance, import of high pressure gas means to import a refrigerant gas contained in refrigeration equipment with a daily refrigerating capacity of 20 tons or more (50 tons or more in case where the high pressure gas inside the refrigeration equipment is a fluorocarbon or ammonia) (Article 31 of the Refrigeration Ordinance; Circular Notices (Internal Rules)).

The ordinance concerning the import of refrigerant is as follows:

- Import Inspection

## 2-6. Technical Standards, etc., for Disposal of High Pressure Gas (Chapter VI of the Refrigeration Ordinance)

With respect to the Refrigeration Ordinance, disposal of high pressure gas means to take out the high pressure gas from refrigeration equipment and render it into an uncontrollable state and to transform the gas inside the refrigeration equipment along with such equipment into an uncontrolled state (Article 34 of the Refrigeration Ordinance; Circular Notices (Internal Rules)).

The technical standards for disposal of refrigerant are as follows:

- Dispose of a flammable gas gradually at a location with a good ventilation; and
- Dispose a toxic gas gradually in non-hazardous area.

## 2-7. Voluntary Safety Measures (Chapter VII of the Refrigeration Ordinance)

### (1) Hazard Prevention Rule

A Class 1 Producer shall draw up a Hazard Prevention Rule describing the items to be

observed by a Class 1 Producer him/herself and his/her employees for maintenance of safety, and shall submit a notification report thereof to the prefectural governor (Article 26, paragraph (1) of the Act).

The following are the main items to be included in a Hazard Prevention Rule (Article 35, paragraph (2) of the Refrigeration Ordinance):

- Safety management system and the scope of duties for a Refrigeration Safety Manager;
- Safe operation and handling of production equipment;
- Patrol and inspection of production facilities;
- Management of new establishment or extension and repair work of production facilities;
- Measures taken to prevent disaster and training methods therefor;
- Work management of associated companies;
- Method of making the Hazard Prevention Rule known to employees and the measures to be taken against anyone who violates the Rule; and
- Procedures for the preparation and alteration of a Hazard Prevention Rule.

Parenthetically, these matters to be prescribed are the same as specified in Article 63, paragraph (2) of the General High Pressure Gas Safety Ordinance.

## (2) Refrigeration Safety Manager

Class 1 Producers and Class 2 Producers shall appoint Refrigeration Safety Managers from among the holders of a Production Safety Management Certificate who have specified experience, according to the specified categories for appointment (Article 27-4 of the Act).

The categories for appointment of Refrigeration Safety Managers are as shown in the table below (Article 36 of the Refrigeration Ordinance).

Table 6: Categories for appointment of Refrigeration Safety Managers

Categories of production facilities	Holders of a Production Safety Management Certificate	Experience in production of high pressure gas
Daily refrigeration capacity is 300 tons or more	Class 1 Refrigeration Safety Manager Certificate	Experience of 1 year or longer in production of high pressure gas, using production equipment with a daily refrigeration capacity of 100 tons or more
Daily refrigeration capacity is 100 tons or more and less than 300 tons	Class 1 Refrigeration Safety Manager Certificate or Class 2 Refrigeration Safety Manager Certificate	Experience of 1 year or longer in production of high pressure gas, using production equipment with a daily refrigeration capacity of 20 tons or more
Daily refrigeration capacity is less than 100 tons	Class 1 Refrigeration Safety Manager Certificate, Class 2 Refrigeration Safety Manager Certificate or Class 3 Refrigeration Safety Manager Certificate	Experience of 1 year or longer in production of high pressure gas, using production equipment with a daily refrigeration capacity of 3 tons or more

\*Facilities that are not required to appoint a Refrigeration Safety Manager

1. Refrigerant gas is an inert fluorocarbon:  
Class 2 production facilities with a daily refrigeration capacity of less than 50 tons, unit-type production equipment, and accredited safety facilities
2. Refrigerant gas is a fluorocarbon other than inert ones and other than ammonia:  
Class 2 production facilities with a daily refrigeration capacity of less than 20 tons, unit-type production equipment with a refrigerant gas that is not a flammable gas or a toxic gas
3. All production facilities that use fluorocarbon 114 as the refrigerant gas

The “unit-type production equipment” mentioned in the footnote of the Table 6 is a common name for the production equipment which satisfies the conditions prescribed in Article 36, paragraph (2) of the Refrigeration Ordinance, such as an assembly of refrigeration equipment

and a compressor motor in a single frame at a plant of Apparatus Manufacturer, along with others.

Refrigeration Safety Managers manage the operation in relation to the maintenance of safety in high pressure gas production.

## 2-8. Safety Inspection and Periodical Self Inspection (Chapter VIII of the Refrigeration Ordinance)

### (1) Safety Inspection

A Class 1 Producer shall subject his/her facilities for production, which may have the possibility of explosion or other disasters due to high pressure gas (limited to those facilities designated by an ordinance of the Ministry of Economy, Trade and Industry (METI); hereinafter referred to as “Designated Facilities”), periodically and in accordance with the provisions of an ordinance of METI, to a Safety Inspection conducted by the prefectural governor; provided, however, that this shall not apply to either of the following cases:

- i) When the Safety Inspection of Designated Facilities specified by an ordinance of METI has been conducted by the High Pressure Gas Safety Institute of Japan or an agency designated by the Minister of METI (hereinafter referred to as “Designated Safety Conformity Inspection Body”) pursuant to the provisions of an ordinance of METI, and a notification report thereof has been submitted to the prefectural governor; or
- ii) When a person accredited by the Minister of METI as qualified to implement the safety inspection of Designated Equipment by him/herself (hereinafter referred to as “Accredited Safety Inspection Executor”) submits inspection records to the prefectural governor regarding Designated Facilities for which the accreditation for safety inspection is given (Article 35 of the Act).

Currently, in most cases, Class 1 Producers subject their Designated Equipment to the Safety Inspection conducted by the High Pressure Gas Safety Institute of Japan, rather than by a prefectural governor, and submit a notification to the prefectural governor in accordance with i) above.

Safety Inspection by a prefectural governor shall be conducted at least once every 3 years (Article 40, paragraph (2) of the Refrigeration Ordinance).

Production facilities that are not considered the Designated Facilities (Article 40, paragraph (1) of the Refrigeration Ordinance):

- Production facilities that use helium, R21, or R114 as a refrigerant gas:  
These gases are not subject to the Safety Inspection due to their lower pressures, although they are included in the category of high pressure gas for the purpose of this Act, and therefore are subject to the permission and notification requirements; and
- The parts that are accredited as Specified Equipment in a production facility.

Accredited Safety Inspection Executors:

- An Accredited Safety Inspection Executor is a Class 1 Producer accredited by the Minister of METI as qualified to implement the safety inspection of Designated Facilities by him/herself (Article 35, paragraph (1) of the Act).

- Safety Inspection by a prefectural governor is not necessary when an Accredited Safety Inspection Executor submits to the prefectural governor the records of the Safety Inspection of the Designated Facilities conducted by him/herself.
- The accreditation shall cease to be effective unless it is renewed by the end of every 5-year period (Article 51 of the Refrigeration Ordinance).
- To date, there are no producers who are accredited as an Accredited Safety Inspection Executor.

(2) Periodical Self Inspection

Class 1 Producers and particularly specified Class 2 Producers shall conduct a periodical self-inspection (once a year or more), to determine whether or not their facilities, etc., conform with the technical standards specified (Article 35-2 of the Act, Article 44 of the Refrigeration Ordinance).

## 2-9. Accreditation of the Specified Equipment (Chapter XI of the Refrigeration Ordinance)

Specified Equipment is the equipment specified by an Enforcement Order to have no risk of interfering with the maintenance of public safety and the prevention of disasters (Article 56-7 of the Act).

Specified Equipment for Refrigeration:

A piece of unit-type equipment which produces high pressure gas by compressing or liquefying inert gas for refrigeration and which is specified by the Minister of METI (Article 15 of the Cabinet Order).

The equipment specified by the Minister of METI as referred herein is that which satisfies all of the following (Article 6, paragraph (2) of the Public Notice Related to the Enforcement Order of the High Pressure Gas Safety Act):

- Said equipment is a piece of stationary production equipment;
- Refrigerant gas for said equipment is a fluorocarbon (limited to an inert fluorocarbon);
- Filling amount of the refrigerant gas for said equipment is less than 3,000 kg; and
- The daily refrigerating capacity of said equipment, calculated according to the provision of Article 5 of the Refrigeration Ordinance, is 50 tons or more.

Any person who produces high pressure gas using only the Specified Equipment accredited to be in conformity with the technical standards shall notify as a Class 2 Producer even when the refrigerating capacity of such Specified Equipment falls under the description of a Class 1 Producer (Article 5 of the Act).

Specified Equipment is accredited by the Minister of METI, the High Pressure Gas Safety Institute of Japan or a Designated Accreditation Agency for Specified Equipment in cases where the equipment conforms to the technical standards provided for in Article 57 of the Refrigeration Ordinance. This accreditation is currently conducted only by the High Pressure Gas Safety Institute of Japan.

## 2-10. Technical Standards, etc., for Manufacture of Apparatuses (Chapter XII of the Refrigeration Ordinance)

Any person who intends to engage in the business of manufacturing apparatuses to be exclusively used in refrigeration equipment and specified by an ordinance of METI (such person is hereinafter referred to as “Apparatus Manufacturer”) shall manufacture apparatuses in accordance with the technical standards specified in Article 64 of the Refrigeration Ordinance to ensure that the equipment using such apparatuses conforms with the technical standards (the technical standards concerning the location, construction, and equipment of the facilities for production), provided for in item (i) of Article 8, or paragraph (1) of Article 12 of the High Pressure Gas Safety Act (Article 57 of the Act).

In other words, Apparatus Manufacturers have an obligation to manufacture apparatuses according to the technical standards. Furthermore, in cases where such apparatuses do not conform with the technical standards, the producers of high pressure gas, who are the users of such apparatuses, are not in conformity with the technical standards provided for in item (i) of Article 8, or paragraph (1) of Article 12 of the High Pressure Gas Safety Act.

The apparatuses specified by an ordinance of METI as mentioned above are the apparatuses exclusively used for refrigeration equipment and are refrigerators with a daily refrigerating capacity of 3 tons or more (5 tons for fluorocarbon (limited to an inert fluorocarbon)) (Article 63 of the Refrigeration Ordinance).

Apparatuses are composed of a compressor, condenser, liquid receiver, and other parts that are connected by pipes (Circular Notices (Internal Rules)).

The main technical standards for manufacture of apparatuses are as follows (Article 64 of the Refrigeration Ordinance):

- Materials:  
Materials are appropriate for the design pressure, design temperature, and type of gas;
- Strength:  
Containers shall have safe strength against the maximum stress generated by the design pressure and design temperature;
- Strength of the welded parts:  
The welded parts shall have strength that is equal to or greater than the minimum tensile strength of the base material;
- Non-destructive test of the welded parts:  
The particularly specified welded parts shall successfully pass an appropriate non-destructive test; and
- Leakage test, pressure-proof test:  
Apparatuses shall successfully pass a leakage test as well as a pressure-proof test for the parts other than the pipes; provided, however, that the types of apparatuses which have successfully passed the tests, conducted by the High Pressure Gas Safety Institute of Japan and deemed by the Minister of METI to be equivalent or better than the aforementioned leakage and pressure-proof tests, can be exempt from a pressure-proof test.

### 3. Supplement

#### 3-1. Contents of the Technical Standards Concerning Location, Construction, and Equipment of the Facilities for Production

No.	Technical Standards	Details
1	Distance to flammable and combustible substances	A compressor, oil separator, condenser, and liquid receiver as well as the pipes laid between them shall not be in vicinity of a place where flammable or pyrophoric substances (except those necessary for operations) are accumulated and a place where fire is used (except fire within said production equipment); provided, however, that this shall not apply when safety measures are taken for said fire.
1	Distance to place where fire is used	
2	Warning signs	Warning signs shall be placed at production facilities in a way visible from the outside of said facilities.
3	Construction to prevent gas build-up	Rooms where a compressor, oil separator, condenser, or liquid receiver and the pipes laid between them (limited to those for production equipment of flammable gas or toxic gas) shall have constructions that prevent gas build-up in case of a refrigerant gas leakage.
4	Vibration, impact, corrosion, etc.	Production equipment shall not leak refrigerant gas due to vibration, impact, corrosion, etc.
5	Seismic resistant design	Condensers (limited to the upright cylindrical type with a body measuring 5 m or more in length), liquid receivers (limited to those with an internal volume of 5,000 L or more) and pipes (limited to those specified by the Minister of METI) as well as the supporting structures and foundations therefor (hereinafter referred to as "seismic design structures") shall have safe constructions against the effects of earthquakes, with respect to the seismic motion for designing of seismic design structures (hereinafter referred to as "design seismic motion"), calculation methods of stress, etc., applied to the parts which are important for seismic resistance of a seismic design structure according to the design seismic motion (hereinafter referred to as "the methods of calculating stress, etc., on seismic design structures"), the allowable seismic stress on materials for seismic design structures and other seismic resistant design codes specified by the Minister of METI; provided, however, that the methods of calculating stress, etc., on seismic design structures may be those deemed appropriate by the Minister of METI in terms of seismic resistant design (limited to the methods by the persons who are deemed capable of such calculation by the Minister of METI).
6	Leakage test and pressure-proof test	Refrigerant equipment shall successfully pass a leakage test conducted at a pressure greater than the allowable pressure and a pressure-proof test for parts other than pipes, using water or other safe liquid with at least 1.5 times the allowable pressure (a pneumatic test of at least 1.25 times the allowable pressure, using air, nitrogen or other gas, when using liquid is deemed difficult) or the tests conducted by the High Pressure Gas Safety Institute of Japan (hereinafter referred to as the "Institute") that are deemed by the Minister of METI to be equivalent or better than the aforementioned leakage and pressure-proof tests.
7	Pressure gauge	Refrigerant equipment (including the hydraulic system of a compressor (except one using a force fed lubrication system and with a protective device against lubricating oil pressure)) shall be equipped with a pressure gauge.
8	Safety devices	Refrigerant equipment shall be equipped with safety devices which bring the pressure of refrigerant gas in said equipment back to a pressure under the allowable pressure in case where the pressure of refrigerant gas exceeds the maximum allowable pressure.
9	Position of the discharge pipe opening	Among the safety devices installed as prescribed in the preceding item (excluding those installed on a piece refrigerant equipment which does not release refrigerant gas from said equipment to the atmosphere or which uses an inert gas as its refrigerant gas, and an ammonia absorption refrigerator (limited to those in conformity with the standards specified in the subsequent item; the same shall apply hereafter in this Article)), safety valves or rupture discs shall be equipped in a discharge pipe. In this case, the opening of the discharge pipe shall be positioned appropriately in accordance with the properties of the refrigerant gas to be released.
9-2	Standards for ammonia absorption refrigerators	The ammonia absorption refrigerator prescribed in the preceding item shall conform to the following standards: The sub-items (a) to (i) are omitted.
10	Type of level gauge	A level gauge, installed on a liquid receiver for refrigerant equipment which uses flammable gas or toxic gas as its refrigerant gas, shall be other than a glass tube liquid level gauge.
11	Breakage prevention of level gauge	In case where a glass tube liquid level gauge is installed on a liquid receiver, a measure shall be taken to prevent breakage of said level gauge. In addition, a measure shall be in place for the pipe, which connects the said liquid receiver (limited to one for refrigerant equipment using a flammable or toxic gas as its refrigerant gas) and said glass tube liquid level gauge, to prevent leakage caused by breakage of said glass tube liquid level gauge.
11	Prevention of leaks caused by breakage of level gauge	
12	Fire extinguishing equipment	A production facility of flammable gas shall be equipped with appropriate fire extinguishing equipment at appropriate locations, in accordance with its scale.
13	Spillage prevention	A liquid receiver with an internal volume of 10,000 L or more for refrigerant equipment using a toxic gas as its refrigerant gas shall have measures in its surroundings to prevent spillage in case of leakage of said gas in liquid form.
14	Explosion-proofing of electrical equipment	Electrical equipment for refrigerant equipment using a flammable gas (except ammonia) as its refrigerant gas shall have explosion-proof constructions according to the installed location thereof



		and the type of the refrigerant gas.
15	Detection and alarm equipment	In production facilities for flammable gas or toxic gas, equipment capable of detecting and alarming the leakage of said gas shall be installed at locations where the gas leaked from said facilities may build up; provided, however, that this shall not apply to facilities with ammonia absorption refrigerators.
16	Abatement device	Production equipment of toxic gas shall have abatement measures to safely and quickly detoxify in case of a leakage of said gas; provided, however, that this shall not apply to facilities with ammonia absorption refrigerators.
17	Operation of valves and cocks	Measures shall be in place for valves and cocks installed on production equipment (for operating buttons, etc. in case where valves and cocks are opened and closed by operating buttons, etc.; excludes valves and cocks that automatically open and close without the use of operating buttons, etc.; the same shall apply hereafter) to enable the workers to appropriately operate said valves and cocks.

### 3-2. Contents of the Technical Standards Concerning the Methods of Production

Technical Standards	Details
Stop valves for safety valves	Stop valves attached on safety valves shall be kept open at all times; provided, however, that this shall not apply when it is particularly necessary to close them for repair and cleaning of the safety valves.
Daily inspection of the production facilities	For the production of high pressure gas, the production facility to which the production equipment belongs shall be inspected for abnormalities at least once a day, according to the type of high pressure gas being produced and the form of the production equipment. When an abnormality is detected, said equipment shall be repaired or other hazard prevention measures shall be taken.
Repair and cleaning methods, etc.	Repair and cleaning of a refrigerant equipment and production of high pressure gas after such repair and cleaning shall be conducted under conditions without any interference to the maintenance of safety, according to the following standards:
a. Work plan and person in charge for repair and cleaning	A work plan and a person in charge shall be determined in advance of the repair and cleaning work. Repair and cleaning shall be performed according to such work plan and under the supervision of said person in charge. Furthermore, measures shall be in place to immediately report any abnormalities to said person in charge.
b. Repair and cleaning of refrigeration equipment with flammable or toxic gas	Hazard prevention measures shall be taken for the repair and cleaning of a refrigerant equipment which uses a flammable gas or toxic gas as its refrigerant gas.
c. In case where refrigerant equipment is overhauled for repair and cleaning	In case where a piece of refrigerant equipment is overhauled for repair and cleaning, measures shall be taken to prevent leakage of gas from other parts into the opened parts of said refrigerant equipment.
d. After completing the repair and cleaning	After completing the repair and cleaning, production may be started only after confirming that said refrigerant equipment operates normally.
Operation of valves	When operating valves are installed on a piece of production equipment, necessary measures shall be taken so not to apply an excessive force on said valves, by taking material, construction, and condition of the valves into consideration.
Test operation or leakage test after installation or alternation works	After completing an installation or alteration work of a piece of production equipment, production may be started only after performing a test operation using a gas other than oxygen or a leakage test at a pressure greater than the allowable pressure (limited to the leakage test conducted after removing the flammable gas contained in the refrigerant equipment, when using air).