

## Notification of Ministry of Energy

Subject: Regulations and Methods of Storage, Assignment of Responsible Special Personnel,  
and Exemption to Follow the Hazardous Substances Act 1992 (B.E.2535)  
for Areas of Liquefied Petroleum Gas Responsible by the Department of Energy Business  
2011 (B.E.2554)

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By virtue of Section 5 Paragraph Three, Section 20 (1) (2) (5), Section 20/1, Section 36 and Section 44 of the Hazardous Substances Act, 1992 (B.E.2535), which is a law consisting of some covenant relating to limitation of right and freedom of persons, Section 29 together with Section 33, Section 41 and Section 43 of the Constitution of the Kingdom of Thailand legislates to act so by virtue of the covenant of the law. The Minister of the Ministry of Energy with the approval of the Committee on Hazardous Substances has issued the Notification as follows:

Clause 1        This Notification shall be effective from the next date of the Government Gazette and henceforth.

Clause 2        In this Notification:

“Hazardous Substances” mean liquefied petroleum gas responsible by the Department of Energy Business according to the Notification of the Ministry of Industry on List of Hazardous Substances issued subject to Section 18 Paragraph Two of the Hazardous Substances Act, 1992 (B.E.2535).

“Liquefied Petroleum Gas” means liquefied petroleum gas consisting of propane, propylene, normal butane, isobutene or butylenes or either one or many, most of which consisting together contained in cooking gas cylinders or collection and distribution gas tanks.

“Areas of Liquefied Petroleum Gas” mean enterprises that keep liquefied petroleum gas as fuel or raw materials for production but not limit to the usage of cooking gas in household.

“Cooking Gas Cylinders” mean containers containing liquefied petroleum gas for cooking, lighting or other objectives, having no more than 500 liters or 250 kilograms capacity with the Industrial Standard according to the law on the Thailand Industrial Standards.

“Tanks” mean containers containing liquefied petroleum gas with more than 500 liters or 250 kilograms capacity.

“ASME” means the American Society of Mechanical Engineers.

“API” means American Petroleum Institute.

“NFPA” means National Fire Protection Association

“Megapascals” means the measure of pressure according to the law on Thailand Industrial Standards.

“The Collection Amount of Liquefied Petroleum Gas” means the maximum amount of liquefied petroleum gas able to be collected, whether liquefied petroleum gas is contained in cooking gas cylinders or tanks or not.

“Electronic appliances” mean equipments for general utility, normally produced under international standard by installing or assembling in one category for single or multi functions such as the gas leak detection, air-conditioners, fans, water pumps.

“Devices” mean one unit of the electricity system intended to be a currency path, not electricity power.

“Equipments” mean items including materials, components, devices, electronic appliances, lamps, complete sets and other similar items used as a part or a connection of the installation of electricity.

“Explosion Proof” means the capacity to withstand the explosion within a flameproof and to protect spark or explosion of liquefied petroleum gas within a flameproof resulting in igniting a fire at that outside of the proof or in explosion, and the temperature must not be too high to cause igniting a fire at that outside of the proof or explosion.

“Components” mean assemblies of nuts or other parts of the wire-up system used for the objective of mechanic other than electric.

“Wiring” means the installation of the power lines both inside and outside buildings, consisting of power line circuit, lightings, control and signal, including devices and components of the wiring both the installation of power line, the permanent and temporary installation.

“Sealing Joints” mean components of the joint connection, able to protect the flow of liquefied petroleum gas.

“Sealing Compound” mean substances made for sealing the sealing joints to protect the flow of liquefied petroleum gas.

## Chapter 1

### Regulations and Methods of Storage

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#### Part 1

#### General

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Clause 3      Manufacturers, importers, exporters are exempt to request for permission for hazardous substances subject to Section 23 Paragraph One of the Hazardous Substances Act, 1992 (B.E.2535).

Manufacturers, importers, exporters do not have to register the hazardous substances subject to Section 36 Paragraph Two of the Hazardous Substances Act, 1992 (B.E.2535).

Clause 4 Possessors of hazardous substances in the areas of liquefied petroleum gas with no more than 500 kilogram liquefied petroleum gas collection in total shall be exempt to request for permission to possess liquefied petroleum gas subject to Section 23 Paragraph One of the Hazardous Substances Act, 1992 (B.E.2535), but provided that the collection amount of liquefied petroleum gas is over 250 kilograms, the officer shall be informed on the possess and the compliance of the regulations on the collection specified by the Department of Energy Business shall be performed.

Clause 5 Possessors of hazardous substances in the areas of liquefied petroleum gas with over 500 kilograms liquefied petroleum gas collection in total shall store and use liquefied petroleum gas from tanks.

Clause 6 Persons who hold licenses to possess hazardous substances wishes to terminate the factory business or stop using tanks shall be certified by the inspector and tested that no gas remained.

The termination subject to Paragraph One shall be informed to the officer with the certified document subject to Paragraph One.

When the approval is reached, the use of gas tanks are no longer allowed until the renew permission is granted.

## Part 2

### Layout and Pattern

Clause 7 Layout and pattern of areas of liquefied petroleum gas permitted to possess as hazardous substances shall be as specified by the Department of Energy Business.

## Part 3

### Tanks and the Positioning

Clause 8 Tanks shall be containers with size and specifications as follows:

(1) Tanks with capacity of less than 500,000 liters shall be ones designed, manufactured or built with the standards of ASME Section VIII Division 1: Rules for Construction of Pressure Vessels with the design pressure no less than 1.65 megapascals.

Tanks with capacity of over 500,000 liters shall be ones designed, manufactured or built with the standards of ASME Section VIII Division 1: Rules for Construction of Pressure Vessels or ASME Section VIII Division 2: Alternative Rules for Construction of Pressure Vessels with design pressure no less than 1.25 times of the pressure of liquefied petroleum gas whose type that will be stored at the temperature of 42 degree celcius.

Tanks only for propane, propylene, normal butane, isobutene or butylenes shall be ones designed, manufactured or built with the standards of ASME Section VIII Division 1: Rules for Construction of Pressure Vessels or ASME Section VIII Division 2: Alternative Rules for Construction of Pressure Vessels or other standards as specified by the Department of Energy Business with the design pressure to receive the pressure of liquefied petroleum gas whose type that will be stored at the temperature of 42 degree celcius.

(2) The outer surface of tanks above the ground shall be painted with rustproof prime coat at least twice and be painted out with thermal barrier coat at least twice.

(3) The outer surface of tanks, mounded type or underground shall be painted with decomposing proof materials, such as asphalt or other substitute materials which will not cause pollution, at least twice.

(4) The surface of tanks, whether they are above the ground, mounded type or underground shall be attached permanantly with the base of the tanks, and the tanks shall be attached to the tank pole and the foundation of the tanks which cannot be moved or floated. The pole and foundation of the tanks shall be strong enough to safely receive the weights of the tanks and gas in the maximum collection rate of the tanks, including other weights that may act on the pole or foundation.

Clause 9 Tanks shall have joints to install the devices at least as follows:

- (1) Receive and distribution pipes of liquefied petroleum gas
- (2) Liquid release pipes
- (3) Pressure gauge
- (4) Liquefied petroleum gas level gauge
- (5) Safety relief devices
- (6) Lid or cover of the devices in (3) and (4)

In case of the the mounded type or underground tanks shall have manhole connected from the tanks to the outside or over the cover materials or over the ground to install the devices in (3), (4) and (5) and other devices as appropriate.

Clause 10 Tanks shall have metal labels attached to the tank showing details in Thai and/ or English with the same meanings as follows:

- (1) Standard or Standard No. of design

- (2) Name or brand or registered trademark of manufacturer
- (3) Name or brand of inspector
- (4) Date, month, year of manufacture
- (5) Pressure and maximum pressure, maximum and minimum safe temperature used for design calculation
- (6) Net capacity
- (7) Weight including components attached with the tank
- (8) Type and gas amount to be contained
- (9) Registration No. of the tanks registered to the Department of Energy Business

Date, month, year of manufacturers or builder subject to (4) shall mean the date of first test and examination.

The attachment of the label on the tanks must not effect the stability of the tanks.

Clause 11 The positioning of the tanks in the areas of liquefied petroleum gas shall perform as follows:

- (1) Place the tanks with the spaces as specified in the table attached to this Notification.
- (2) Do not place the tanks in stack.
- (3) Do not place the tanks in the basement.
- (4) Spaces under the tanks shall not be lower than the outside ground level, and make a slope in one side as appropriate with concrete floor or tarred with asphalt smoothly without a gap , hole, or lower areas which gas can be collected within the radius of 3.00 meters surrounding the tanks.
- (5) Clear fences shall be made around the areas of the tanks with fireproof materials at least 1.80 meters high around the tanks and the fences shall have at least two entrances/ exits with at least 1.00 meters wide and 5.00 meters in distance. Such entrances/ exits shall be clear doors open to the outside with keys that can open from the inside without locking the door everytime after the operation.
- (6) Filler couplings of the liquefied petroleum gas receive pipe that lead to the tanks shall be far from the buildings or land of other persons in the radius of at least 10.00 meters.

If filler couplings are not far from the buildings or land of other persons in the radius of at least 10.00 meters but more than 5.00 meters in both sides or one side, the tanks can be placed provided that the owners shall build a fireproof walls instead of clear fences at every side of the filler couplings that are not far from the buildings or areas or land of other persons no more than 10.00 meters. The fireproof walls shall be at least 1.80 meters high and far from the filler couplings of at least 5.00 meters.

- (7) Filler couplings of the liquefied petroleum gas receive pipe that lead to the tanks shall be within clear fences or fireproof walls which is used instead of clear fences.

(8) Do not put any materials near clear fences or fireproof walls.

(9) At the entrance gate of the clear fences, the sign with following statements shall be put:

“Danger

1. No Smoking
2. No Fire Ignition
3. No Visitors
4. No Cell Phone”

The statements on the labels shall be in red on the white background which are easy to be seen and read with at least 5 centimeters high in size and the labels shall be put where they are easily seen.

(10) Any sides of clear fences that car may hit, the metal concrete pole of at least 10 centimeters shall be set up. The pole shall be attached to the ground outside the range of that side of the fence at least 60 centimeters and the poles must be far from the fence at least 50 centimeters. Each pole shall be 1.10 meter, but not over 1.20 meters over the ground, and the distance of each pole shall not be over 1.20 meters.

Clause 12 Tanks not designed as specified in Clause 8 by technologies such as temperature control system, etc., they shall be manufactured or built under the standards of API 620 Recommended Rules for Design and Construction of Large, Welded, Low-Pressure Storage Tanks, or other standards as specified by the Department of Energy Business.

#### Part 4

##### Pipe System and Liquefied Petroleum Gas Devices

Clause 13 The installation of the liquefied petroleum gas pipe system and the installation of the devices to the tanks in the areas of liquefied petroleum gas shall be as specified by the Department of Energy Business.

#### Part 5

##### Protection System and Fire Protection

Clause 14 Protection system and Fire protection of the areas of liquefied petroleum gas shall followed the regulations as follows:

(1) Install the dry chemical fire extinguisher or fire extinguisher agents or other fire extinguishers which are not gas type, with at least 6.8 kilograms capacity, able to extinguish a fire at least 10BC, according to the standard of NFPA 58 or other relevant standards, per area under the tanks of 50 square meters; if less than 50 square meters, count as 50 square meters. The calculation of the areas under the tanks shall include the areas surrounded the tanks to 3.00 meters, but provided that every area of liquefied petroleum gas shall have at least 2 fire extinguishers.

(2) Install two-way water pipes for fire extinguishment with at least 62.5 millimeters diameter or as equal to the water pipes for fire extinguishment of the Local Administration, and also water pump specially for fire extinguishment to those pipes with at least 19 millimeters diameter, long enough to cover the areas of the tanks, placed at the convenient place. If water supply is not used, the pipes shall be installed to pump water from the water resources or areas with permanent water, and those areas shall water volume at least 17 cubic meters or 17,000 liters, and one water pump line with at least 19 millimeters diameter shall be added at every 20,000 liters of liquefied petroleum gas; if less than 20,000 liters, count as 20,000 liters.

(3) For each tank with over 50,000 liters capacity, the two dry chemical fire extinguishers or fire extinguisher agents or other fire extinguishers at least 50 kilograms able to extinguish a fire at least 10BC, according to the standard of NFPA 58 or other relevant standards, installed on wheels base shall be added. Such fire extinguishers shall be placed near the tanks.

(4) The above fire extinguishers shall be in good conditions and the owners shall inspect and put on a maintenace every six months with the inspection documents attached or hung at the fire extinguishers.

Clause 15 The above fire extinguishers shall also follow other standards as specified by the Department of Energy Business.

#### Part 6

##### Electricity System and Gas Leak Detection Devices

Clause 16 The settlement of dangerous areas to install electricity system, electronic appliances, devices and equipments of areas of liquefied petroleum gas shall be as specified by the Department of Energy Business.

Clause 17 Every devices and electronic appliances which will be brought to use in dangerous areas shall be explosive proof and be certified by the Industrail Standards Institute, the related government offices or state enterprises, or certified by foreign institutes as approved by the Department of Energy Business.

Clause 18 The wiring in dangerous areas Type 1 or 2 shall be performed as follows:

(1) The wiring shall be in electricity conduit system and thick metal pipes or medium thick connected with metal conduit, certified by the Industrail Standards or other standards as approved by the Department of Energy Business. The underground electricity lines shall be specific type for underground only.

(2) Boxes, components of pipe installation, flexible tube and fixed hoses shall be explosive-proof refle tubes for connecting to conduits.

(3) Conduits connected to electronic appliances housing or other devices which may cause spark or have high temperature shall be installed the sealed fixed hose in as closest to the box and far from the housing not over 0.46 meters.

(4) Conduits placed from undangerous areas to dangerous areas shall be installed sealed fixed hoses at the rear end of dangerous areas.

(5) Conduits placed from dangerous areas and without any fringe in such dangerous areas including the areas within 0.30 meters from dangerous areas on both sides may not install sealed fixed hoses if both ends of such pipes are in undangerous areas.

(6) Sealed fixed hoses shall install at convenient access, and fixed substances shall have qualification to protect leak out of liquefied petroleum gas at the hoses, able to endure the environment and have a melting point not lower than 93 degree celcius.

(7) Sealed compound put into sealed fixed hoses shall not be lesser than size of conduits, and in no case that sealed compound shall be less than 16 millimeter, and do not connect internal lines within hoses and do not use compound to cover connectors or line connectors.

Clause 19 Electronic devices and electronic appliances installed in dangerous areas Type 3 shall put in close boxes to protect spark or parts of hot materials pass through outer side, and those installed at the position risky for physical damages shall have metal screen protection as well.

Clause 20 The wiring in dangerous areas in Clause 19 shall be as follows:

(1) The wiring of lines shall be in refle tubes for thin-type lining or put in metal line track.

(2) Boxes, components of pipe installation and fixed hoses shall not have strands but must have strong-held and close components.

Clause 21 Electricity system, electronic appliances and the wiring methods shall be earth grounding. Details and methods of earth groundng shall be subject to the standards of the Engineering Institute of Thailand or other standards as specified by the Department of Energy Business.

Clause 22 The regulations of electronic lines and the general wiring methods which are not specified in Clauses of this Notification shall be subject to the standards of the Engineering Institute of Thailand or other standards as specified by the Department of Energy Business.



Clause 23 Possessors of hazardous substances in areas of liquefied petroleum gas in total of over 500 kilograms shall install gas leak detection devices near cooking gas cylinders or tanks at least one device per one area.

The gas leak detection devices subject to Paragraph One shall be as specified in Clause 17 and in a ready conditions to be used and open at all times.

## Part 7

### Test and Examination

Clause 24 For newly-manufactured or built tanks, manufacturers or builders shall set up a test and examination by inspector with methods of nondestructive examination to tank as specified by the Department of Energy Business.

Manufacturers or builders of tanks or inspector in any case whatsoever shall issue a certificate as attached to this Notification submitted together with test and examination results of gas tanks to the Department of Energy Business.

Clause 25 Before loading liquefied petroleum gas into tanks being tested and examined as in Clause 24, possessors of hazardous substances shall set up a test or examination of tanks again by inspector by using hydraulic pressure subject to design standards or to those as specified by the Department of Energy Business.

Clause 26 When using tanks being tested and examined as in Clause 24 for every 5 years from the latest test date, licensees to possess hazardous substances shall set up a test and examination subject to Clause 24 by inspector.

Inspector shall issue a certificate as attached attached to this Notification submitted together with test and examination results of gas tanks to the Department of Energy Business.

Clause 27 Test and examination of gas tanks specified other than those in Clause 24, Clause 25 and Clause 26 can be done by other standards as approved by the Department of Energy Business.

Clause 28 At each extension of licenses annually, licensees shall set up an examination of tanks above ground by inspector by at least visual inspection method.

Regulations of test and examination to be considered other than Paragraph One shall be as specified by the Department of Energy Business.

Clause 29 Inspector in this Notification shall have qualifications and incompatibilities as specified by the Department of Energy Business.

Clause 30 Every results of test and examination of tanks shall be approved by the Department of Energy Business.

## Chapter 2

### Responsible Special Personel

Clause 31 Licensees to possess hazardous substances shall have responsible special personel at least one person.

Responsible special personel as in Paragraph One shall be Thai nationality over 20 years old with trainings of liquefied petroleum gas, danger awareness and protection subject to regulations, methods as specified by the Department of Energy Business.

## Chapter 3

### Interim Provision

Clause 32 Possessors of hazardous substances in areas of liquefied petroleum gas shall inform possessive facts or submit a request to officers within one year from the effective date of this Notification.

Clause 33 Possessors of hazardous substances in areas of liquefied petroleum gas shall have responsible special personel subject to Clause 31 within two years from the effective date of this Notification.

Clause 34 Possessors of hazardous substances in areas of liquefied petroleum gas from cooking gas cylinders of total 1,000 kilograms of liquefied petroleum gas being in business before the effective date of this Notification shall process subject to Clause 5 within two years from the effective date of this Notification.

If the performance subject to Paragraph One have practical objections as in Clause 11 (1), (5) and (6), the approval request shall be submitted to the Department of Energy Business directly indicating forms and lists of protection system management which may be caused form practical objections that they are safe enough to engage in a business, and when it is approved, it shall be deemed that the approved forms and lists are specific parts of the performance of this Notification.

Given on 4 May 2011

Wannarat Channukul

Ministry of Energy's Minister

Table 1 for above ground tanks

Capacity of gas tank (Liter)	Maximum distance (Meter)				
	A	B	C	D	E
501-2,250	3.00	1.00	1.50	15.00	6.00
2,251-9,000	5.00	1.00	1.50	15.00	6.00
9,001-135,000	10.00	1.50	3.00	15.00	10.00
135,001-337,000	23.00	X	3.00	15.00	10.00
Over 337,000	30.00	X	3.00	15.00	10.00

Remark: A = distance between wall of tanks and public roads/  
or bounds of lands or other buildings highways

B = distance between walls of tanks together

C = distance between walls of tanks and clear fences

D = in case being close to tanks, it shall have barriers or surrounded walls with distance from walls of tanks and the center of barriers or surrounded walls of oil tanks, but in case being close to oil tanks, no need to have barriers or surrounded walls provided that the distance shall be halved.

E = distance between tanks and oil pumps

X = 1/4 of sum of diameter of adjoining tanks

Table 2 for mounded and underground collection and distribution tanks

Capacity of gas tank (Liter)	Maximum distance (Meter)				
	A	B	C	D	E
500-10,000	3.00	1.50	1.50	20.00	20.00
10,001-50,000	5.00	1.50	1.50	20.00	20.00

- Remark:
- A = distance between wall of tanks and fireproof walls or buildings or bounds of lands
  - B = distance between walls of tanks together
  - C = distance between walls of tanks and clear fences
  - D = distance between tanks and oil pumps
  - E = distance between tanks and underground oil tanks

Mounded gas tanks mean tanks on the ground covered with sandy soil or fireproof materials coated with cement or layed with bricks or other fireproof materials and the thickness of materials of tank covers shall not be less than 0.60 meter round.

The distance between tanks of A, C and D shall be measured from the lowest point of slopes of tank covers.

Underground tanks mean tanks installed in reinforced concrete wells with at least 0.20 meter thickness of graving walls and floors and covered with rough dry freshwater sands with at least 0.60 thick and capped by reinforced concrete cover on the top of well and over such cover shows picture and position of tanks. Concrete wells and well bases shall be designed and built to be able to support force and weights acting on objects safely.

Certificate of Tank

Tank No.....

1. General Information

- 1.1 Manufacture.....
1.2 D/M/Y of manufacture.....
1.3 Manufacturer tank No.....
1.4 Used for store type of stored gas (identify proportion).....

2. Design

- 2.1 Design standard.....
2.2 Design pressure .....Mpa.
2.3 Design temperature ..... Degree Celsius
2.4 Flow rate at least .....scfm
2.5 Corrosion rate as calculation
- Tank shell ..... mm. - Tank top ..... mm.
2.6 Minimum Required Thickness
- Tank shell ..... mm. - Tank top ..... mm.
2.7 Designer .....Registration No.....

3. Type and Qualification of steel plate for manufacture

- 3.1 Standard .....
3.2 Steel plate type .....
3.3 Tension ..... kg/sq.mm. ....Mpa.
3.4 Tank thickness .....mm.
3.5 Tank top plate type .....
3.6 Tension .....kg/sq.mm .....Mpa.
3.7 Tank thickness.....mm.

4. Welding

- 4.1 Welding standard .....
4.2 Welding style
[ ] Round cycle
[ ] Vertical cycle
4.3 Joint Efficiency
- Tank shell .....% - Tank top .....%

5. Heat Treatment

- 5.1 Postweld Heat Treatment on (date) .....

6. General Features

- 6.1 Features .....Size .....Litres

- 6.2 Shell feature [ ] Cylinder
[ ] Sphere Leg distance .....cm.

Inside diameter ..... mm.
Length between weld cycles ..... mm.
Distance between base .....mm.

- 6.3 Shell feature [ ] Hemispherical
[ ] Ellipsoidal
Inside diameter .....mm.

7. Test and Examination

In case of new manufacture or production or become due or others .....
On (date) .....

7.1 Shell results

- Outside diameter ..... mm.
- Shell length from weld cycle .....mm.
- Distance between base ..... mm.
- Shell thickness
-Shell ..... mm. -Top.....mm.

Test pressure ..... Mpa.

Remain pressure for ..... minutes

7.2 Test by other methods .....

Results of test and examination No. .... Date .....

Certify the results of such test and examination passing all regulations of safety standards subject to Hazardous Substances Act, 1992 (B.E.2535) and shall be tested on the next due on (date) .....

Signed .....
(.....)

Inspector permitted by the Department of Energy Business

Signed .....
(.....)

Manufacture or Builder/ Inspector

Signed .....
(.....)

Position.....

Officer of the Department of Energy Business

Signed .....
(.....)

Director-General of the Department of Energy Business

