

DECISION

ANNOUNCEMENT OF NATIONAL STANDARD

MINISTER OF SCIENCE AND TECHNOLOGY

Pursuant to the Law on Standards and Technical Regulations dated June 29, 2006;

Pursuant to Decree No. 127/2007/ND-CP dated August 01, 2007 of the Government detailing the implementation of a number of articles of the Law on Standards and Technical Regulations;

Pursuant to Decree No. 28/2008/ND-CP dated March 14, 2008 of the Government defining the functions, tasks, powers and organizational structure of the Ministry of Science and Technology;

At the request of the Director General of the Directorate for Standards, Metrology and Quality,

DECIDES:

Article 1. Announcing the following national standard:

TCVN 3890:2009 means of fire prevention and fighting for building and works - Equipment, placement, checking and maintenance.

Article 2. This Decision shall take effect from the date of signing.

**FOR THE MINISTER
DEPUTY MINISTER**

Nguyen Quan

NATIONAL STANDARD

TCVN 3890 : 2009

2nd edition

Means of fire prevention and fighting for buildings and works – Equipment, placement, checking and maintenance

TCVN 3890 : 2009

Means of fire prevention and fighting for buildings and works – Equipment, placement, checking and maintenance

1. Scope of application

This standard regulates the equipment and basic requirements for placement, checking and maintenance of means of fire prevention and fighting for buildings and works.

For specialized buildings and works projects with special fire prevention and fighting required, such as production facilities, storage of toxic chemicals, explosives, nuclear facilities, production facilities, big fuel depot, tunnel works, mining, mining, marine works, in addition to compliance with the provisions of this standard, the provisions in other relevant current standards should be complied with.

Buildings and works and means of fire prevention and fighting equipped for buildings and works are not regulated in this standard will be decided by the competent authorities.

2. Reference document

The following reference documents are very important upon application of this standard. For documents with announcement year specified, the version mentioned is applicable. For documents without announcement year specified, the latest version is applicable (including the amendment)

TCVN 2622, *Fire prevention and fighting for buildings and works – Design requirement*

TCVN 4513, *Inside water supply - Design standard*

TCVN 4530, *Petroleum store - Design requirement*

TCVN 4878, (ISO 3941) *Fire classification*

TCVN 5307, *Oil depot and oil product - Design requirement*

TCVN 5684, *Fire safety of petroleum works – General requirement*

TCVN 5738, *Fire alarm system - Technical requirements*

TCVN 5760, *Firefighting system - General requirements for design, installation and use.*

TCVN 7336, *Auto Sprinkler System - Requirements for design, installation*

TCVN 6100 (ISO 5923), *Fire prevention and fighting – Extinguishant - Carbon dioxide*

TCVN 6101 (ISO 6183), *Firefighting equipment - carbon dioxide firefighting system - design and installation.*

TCVN 6305 (ISO 6182), *Fire prevention and fighting – Auto Sprinkler system*

TCVN 7026 (ISO 7165), *Firefighting – Portable fire extinguisher – Features and structure*

TCVN 7027 (ISO 11601), *Firefighting - Wheeled fire extinguisher – Features and structure*

TCVN 7161 (ISO 14520), *Gaseous firefighting - Physical properties and system design.*

TCVN 7435-1 (ISO 11602-1), *Fire prevention and fighting - Portable fire extinguisher and wheeled fire extinguisher. Part 1: Selection and placement*

TCVN 7435-2 (ISO 11602-2), *Fire prevention and fighting - Portable fire extinguisher and wheeled fire extinguisher. Part 2: Checking and maintenance*

3. Terms and definition

In this standard, the following terms are construed as follows:

3.1. Means of fire prevention and fighting

Including motor vehicles, machinery, equipment, tools, chemicals, supporting tools, rudimentary means used exclusively for fire prevention and firefighting, people and property rescue.

3.2. Fire hydrant system for buildings and works

The water supply system to the fire hydrants is installed for buildings and works to ensure the flow and pressure head used for firefighting.

3.3. Fire hydrant

Synthesis of special-use equipment including closure valves, hoses, nozzles are installed to bring water to the fire.

3.4. Outside firefighting water supply system

The system of special-use equipment is installed outside to supply water for firefighting.

3.5. Automatic fire extinguisher

Fire extinguisher operating on automatic principle is hung or placed in the areas that need protection.

3.6. Wheeled fire extinguisher

The extinguisher weighing more than 25 kg but not exceeding 450 kg is designed to be placed on a wheel so that a person can move it and operate the firefighting operations.

NOTE: The wheeled fire extinguisher is also called fire extinguisher cart according to TCVN 7027

3.7. Moving distance of fire extinguisher

The biggest actual moving distance from the position of extinguisher to the position in need of protection

3.8. Rudimentary firefighting equipment

The common tools and materials used in specialized firefighting.

4. General provision

4.1. Building, works, part of works, rooms, chambers and equipment (hereafter referred to as buildings and works) regardless of owner and governing unit of legal personality must be equipped with means of fire prevention and fighting as prescribed by this standard.

4.2. The means of fire prevention and fighting equipped for building and works specified in this standard include:

- Extinguisher: portable extinguisher, wheeled fire extinguisher, automatic extinguisher
- Automatic fire alarm system;
- Firefighting system: automatic or semi-automatic firefighting system by water, steam, powder, foam, gas, the inside fire hydrant system and outside firefighting water supply system;
- Motor firefighting means: fire truck, fire boats and portable fire pumps;
- Means of rescue in the fire, rope rescue, rope ladder, rescue tube;
- Means of protection against smoke, toxic filter masks, gas masks;

- Means of emergency lighting and emergency exit instructions: fire *escape instruction sign*; emergency light; exit light;
- Conventional demolition tools: bolt cutters, hand saws, hammers, crowbars;
- Rudimentary firefighting equipment: drums, water or sand tanks, buckets, barrels, scoops; shovel, long-handled sickle, tinder, fiber blankets; ladder (bamboo, wood or metal), hand pump ...;
- Firefighting materials: water, foam, powder, gas.

4.3. Selection of means of fire prevention and fighting, methods of firefighting, types of extinguishing material and firefighting system must be consistent with the nature and danger level of fire and explosion of the building, works, with each type of fire, with the capacity and effectiveness of each type of firefighting material and firefighting means. The effect of each type of firefighting material is specified in Table 1 and in the relevant current technical standards concerned.

4.4. Classification of fire as specified by TCVN 4878

4.5. The means of fire prevention and fighting must be periodically checked as prescribed. The checking result will be recorded in the monitoring book of means of fire prevention and fighting. The form of book is specified in Annex A.

4.6. The means of fire prevention and fighting must be periodically maintained by the manufacturer's instruction, according to this standards and regulation of the competent authority. During the maintenance and repair of means of fire prevention and fighting at standby position must have plan for placement of corresponding substitute means to ensure fire prevention and fighting safety for building and works.

4.7. The checking and maintenance of means of fire prevention and fighting must be done by the professional organization or its technicians of fire prevention and fighting. The people performing these tasks must be trained and have appropriate professional qualifications.

Table 1 – Effect of firefighting of extinguishant

Extinguishant		Effect of firefighting of types of fire							
		A		B		C	D		
		A1	A2	B1	B2		D1	D2	D3
Water		++		-		-	-		
Foam	Foam with a high <i>multiple</i> of expanse	++		+	-	-	-		

	Foam with a low and average <i>multiple</i> of expanse	+	-	++	+	-	-
Gas	CO ₂	-		+		+	-
	Nitrogen, FM200, Inergen, Argon ...	+		+		+	-
Powder	BC powder	-					-
	ABC powder	+		++		++	-
	ABCD powder					++	-

NOTE:

"++" Very effective

"+" Appropriate firefighting

"-" Inappropriate firefighting

BC powder for fires with symbol B, C

ABC powder for fires with symbol A, B, C

ABDC powder for fires with symbol A, B, C và D

5. Equipment, placement, checking and maintenance of fire extinguisher

5.1. Equipment, placement of fire extinguisher

5.1.1. All areas and items in the buildings and works that are in danger of fire and explosion including places equipped with firefighting system must be equipped with fire extinguishers.

NOTE: The danger level of fire and explosion of buildings and works is specified in TCVN 7435-1 (ISO 11602-1) and Annex D TCVN 7435-2 (ISO 11602-2).

5.1.2. Automatic fire extinguishers equipped for areas which are in danger of irregular fire with people or with people or people but inaccessible. Placement of automatic fire extinguisher in accordance with protected area and height of hanging and placement of each extinguisher.

5.1.3. Taking the equipment and placement into account on the basis of fire extinguisher equipment norm and the greatest moving distance from the placement position of fire extinguisher to the farthest point specified in Table 2.

Table 2 - Fire extinguisher equipment norm and the greatest moving distance from the placement position of fire extinguisher to the farthest point to be protected.

Danger level of fire	Equipment norm	The greatest moving distance to the portable extinguisher and wheeled fire extinguisher	
		For solid fire	For liquid fire
Low	1 extinguisher/150 m ²	20 m	15 m
Average	1 extinguisher /75 m ²	20 m	15 m
High	1 extinguisher /50 m ²	15 m	15 m

5.1.4. Fire extinguishers equipped as specified in 5.1.1 have extinguishants in accordance with requirements in Table 1 and have volume or minimum content (G) not less than that specified in Table 3 for solid fires and Table 4 for liquid and gas fires.

Table 3 –Volume or content of extinguishant for solid fires

Danger level of fire	Volume or content of extinguishant, G		
	Powder, kg	Foaming solution or water with additives, liter	Clean fire gas, kg
Low	$G \geq 2$	$G \geq 6$	$G \geq 6$
Average	$G \geq 4$	$G \geq 10$	$G \geq 8$
High	$G \geq 6$	-	-

Table 4 - Volume or content of extinguishant for liquid or gas fires

Danger level of fire	Volume or content of extinguishant, G			
	Powder, kg	Foaming solution or water with additives, liter	Clean fire gas, kg	Carbon dioxide, kg
Low	$G \geq 4$	$G \geq 5$	$G \geq 4$	$G \geq 5$
Average	$G \geq 6$	$G \geq 9$	$G \geq 9$	-
High	$G \geq 15$	$G \geq 25$	-	-

5.1.5. For areas with long or narrow area or areas with different and adjacent floor levels, the equipment of fire extinguisher must still ensure the moving distance from the placement position of fire extinguishers to the farthest point to be protected not exceeding the provisions specified in 5.1.3.

5.1.6. On the same floor or storey, if the space is separated into different areas by walls, partitions or other obstructions without passage-way, the equipment of fire extinguisher must be separate in accordance with provisions specified in 5.1.3 and 5.1.4.

5.1.7. There must be a number of fire extinguishers reserved not less than 10% of the total fire extinguishers for replacement equipment as needed.

5.1.8. The fire extinguishers are placed at design position. They must not placed *concentratedly at one place*.

5.1.9. Fire extinguishers must ensure the features and structures specified in TCVN 7026 (ISO 7165); TCVN 7027 (ISO 11601).

5.1.10. In addition to provisions in this standard, the selection and placement of fire extinguisher must comply with provisions in TCVN 7435-1 (ISO 11602-1).

5.2. Checking and maintenance of fire extinguisher

5.2.1. Checking and maintenance of fire extinguisher are specified in TCVN 7435-2 (ISO 11602-2).

5.2.2. The result of checking and maintenance of fire extinguisher is recorded in the monitoring book (Annex A) and monitoring card attached on each fire extinguisher (Annex B)

6. Equipment, placement, checking and maintenance of automatic fire alarm system

6.1. Equipment, placement of automatic fire alarm system

6.1.1. The automatic fire alarm systems are constituted from basic parts: the fire alarm center, fire detector, fire alarm push-button, sound and light alarm equipment and associated equipment and power supply. Each part of the system must ensure adequate basic functions and integrate links into a complete fire alarm system.

6.1.2. The technical requirements for automatic fire alarm system are specified in TCVN 5738.

6.1.3. Types of building and works must be equipped with automatic fire alarm system:

a) The administrative buildings, head offices of the government agencies, socio-political organizations of district-level or higher level, other administrative buildings, head offices and office buildings from 5 storeys or more, or a volume of 5,000 m³ or more;

b) Hotels, guest houses, motels and inns from 5 storeys or more, or a volume of 5.000m³ or more, other residential houses from seven storeys or more;

c) Buildings and works of technological and scientific research facilities from five storeys or more or a volume of 5.000m³ or more;

d) Schools, educational institutions, hospitals, nursing homes from five floors or more or total volume of 5.000m³ or more; nursery and kindergarten, with 100 children or more or a total volume of 1.000m³ or more or other medical examination and treatment facilities with 50 beds or more;

dd) Theatres, cinemas, auditorium halls, cultural houses, sporting event hall and other crowded places with designed 200 seats or more; dancing halls, clubs, entertainment service facilities and other public works with the area from 200m² or more or volume from 1000 m³ or more.

e) Markets and solid and semi-solid commercial centers;

g) Archives, libraries, museums and exhibitions;

h) Broadcasting and television stations, telecommunications facilities from district-level or higher;

i) Airports, railway stations of type 1 (cargo and passenger terminal); car and motorcycle garage with a volume of 5000m³ or more;

k) Production building and works with burnable substances and goods with a volume of 5000m³ or more;

l) Power plant and substation placed in building;

m) Warehouses and ports of import, export of gasoline and LPG;

n) Other goods and materials storages in danger of fire with a volume of 1000m³ or more;

o) Command, dispatch, operation and control centers of national and regional size in all fields;

p) Works of security and national defense in danger of fire and explosion or with requirements of special protection;

q) The underground works in danger of fire and explosion, basement

6.2. Checking and maintenance of automatic fire alarm system

6.2.1. The automatic fire alarm system after being installed must be tested its operation of entire system. The automatic fire alarm system is only put into operation when the testing result indicates that the system fully meets all requirements of design and relevant standards.

6.2.2. The automatic fire alarm system after being put into operation must be checked at least twice for every year. When checking, it is necessary to test all functions of the system and operation capacity of all equipment of the system.

6.2.3. The periodical maintenance of automatic fire alarm system is done depending on the environmental conditions of the place where it is installed and in accordance with the instruction of the manufacturer, but at least twice a year, the maintenance of the entire system must be done. The maintenance will include the overall checking of operation of all system equipment.

7. Equipment, placement, checking and maintenance of automatic firefighting system

7.1. Equipment and placement of automatic firefighting system

7.1.1. The automatic firefighting system must be equipped for buildings and works specified in Annex C. The equipment of automatic firefighting system for other buildings and works based on the analysis of danger level of fire and factors relating to the protection of people and property.

In the buildings and works specified in Annex C, there should be an automatic firefighting system for all rooms not depending on area excluding the following areas:

- Wet areas (bathrooms, toilets, refrigerating chamber, washing area ...);
- Staircase;
- Areas without any danger of fire.

7.1.2. Selection of automatic firefighting system for buildings and works as specified in 7.1.1 must be included with the extinguishant in accordance with requirements in Table 1 and requirements for protection.

7.1.3. It must take the requirements for protection of people into account upon design and equipment of firefighting system with gas; there must be appropriate measures of protection to ensure that people quickly move out of the danger area and limit the entrance in this area after gas has been released excluding the case of victims' quick first aid; the requirements of TCVN 6100, TCVN 6101 and TCVN 7161-1 must be met.

7.1.4. When placing and installing the automatic firefighting system which may be dangerous to people, it is necessary to calculate the escape time to ensure the last person to escape the room or area to be protected before the automatic system releases the extinguishant.

The exit way in the building and works equipped with the automatic firefighting system must be in accordance with the provisions in 7.1.3 and other relevant standards.

7.1.5. The automatic firefighting system must have the automatic or manual control. For firefighting system with water of flushing nozzle type (Drencher), the firefighting extinguishing system with steam or gas may be designed with remote or manual control.

7.1.6. The automatic firefighting system with water must have fire hydrant installed outside to supply water for fire truck or mobile fire pumps.

7.1.7. Other provisions on selection and placement of automatic firefighting system are specified in TCVN 5760, TCVN 6101, TCVN 6305, TCVN 7161-1, TCVN 7336 and other relevant standards.

7.2. Checking and maintenance of automatic firefighting system

7.2.1. The automatic firefighting system after being installed must be tested its entire system. The automatic firefighting system is only put into operation when the testing result indicates that the system fully meets all requirements of design and relevant standards.

7.2.2. Unless otherwise directed by the manufacturer, the automatic firefighting system must be periodically checked and maintained at least once a year.

7.2.3. During each checking and periodic maintenance, except for devices used only once as sprinkler, disposable heat detector disposable ... all devices and functions of the system must be checked and tested their operation particularly checking the amount and quality of extinguishant.

7.2.4. Checking and maintenance of automatic firefighting system will comply with TCVN 6101, TCVN 6305, TCVN 7161-1 and other relevant standards and manufacturers' instructions.

8. Equipment, placement, checking and maintenance of fire hydrant system inside and outside the buildings and works

8.1. Equipment, placement of fire hydrant system inside the buildings and works

8.1.1. The fire hydrant system equipped for the following buildings and works:

- a) Production building with an area of 500 m² or more, or a volume of 2500m³ or more;
- b) Warehouse with an area of 500 m² or more, or a volume of 2500m³ or more;
- c) In the family home from 7 storeys high or more, dormitories, hotels, condominiums and restaurants from 5 storeys high or more;
- d) Administrative offices from 6 stories high or more; schools, hospitals from 3 storeys high or more;
- dd) Gas stations and other public works, ancillary houses of industrial works when the volume of the house is 5000m³ or more.
- e) Theatres, cinemas, auditorium halls, clubs from 300 seats or more;
- f) Markets and solid and semi-solid and commercial centers;

8.1.2. The following cases are not required to install the fire hydrant inside the buildings and works;

- a) Production building with refractory grade I, II and the interior equipment made of non-flammable materials particularly the processing, transportation and preservation of finished products which are non-flammable materials;
- b) Production building of D and E-commerce class with the refractory grade III, IV, V and volume of less than 1000m³;
- c) In the bathrooms, the public washing areas;
- d) In the warehouse made of non-flammable material and non-flammable cargo;
- dd) In pumping stations, water purification stations of waste water drainage system.
- e) In the production buildings and ancillary houses of industrial works that have no water supply line for domestic use or production and the water supply for firefighting outside is from the river, lake, pond, or water tank.

8.1.3. No equipment of fire hydrant inside the buildings and works if using or preserving substances which may cause fire or explosion or fire spread upon contact with water.

8.1.4. The fire hydrant system inside the buildings and works, production buildings and warehouses having high fire danger level, buildings and works with the height of 25m or more, markets, commercial center, hotels, dancing halls, railway stations, seaports, theaters, cinemas must regularly have water which is maintained at automatic firefighting system pressure to ensure the requirement for firefighting.

8.1.5. The fire hydrant system inside the buildings and works may be designed independently or combined with the automatic firefighting with water.

8.1.6. A number of fire hydrants, flow, fire water pressure column inside the buildings and works are specified in TCVN 2622.

8.1.7. The technical requirements of the fire hydrant system inside the buildings and works comply with TCVN 2622, TCVN 4513, TCVN 5760 and relevant current standards and regulations.

8.2. Equipment and placement of water supply system for firefighting outside the buildings.

8.2.1. The water supply system for firefighting outside the buildings equipped for the following works:

- a) Administrative offices, dormitories, condominiums;
- b) Hotels, hospitals, schools, cultural and sports facilities;
- c) Markets, commercial centers, supermarkets;

d) Gas stations, warehouses, ancillary houses of industrial works and other public works;

dd) Production buildings and industrial works;

8.2.2. The following cases do not require the installation of water supply systems for firefighting outside the buildings.

a) Residential areas with people of less than 50 people and buildings of not more than 02 storeys;

b) Buildings outside residential areas, dining establishments with automatic firefighting system volume of up to 1000m³, stores with area of up to 150m² (excluding industrial goods stores) and public buildings with refractory grade I, II and volume of 250m³ placed at residential areas.

c) Production buildings with production grade E and refractory grade I, II and volume of up to 1000m³ (excluding buildings with unprotected metal, wooden or plastic columns with automatic firefighting system volume of larger than 250m³).

d) Storages of seasonal agricultural products with a volume of less than 1000m³;

dd) Storage of burnable or nonflammable in burnable packing with area of up to 50m².

8.2.3. Technical requirement of the water supply system for firefighting outside the buildings will comply with TCVN 2622, TCVN 5760 and relevant current standards and regulations.

8.3. Checking and maintenance of fire hydrant system inside the buildings and works and water supply system outside the buildings

8.3.1. The fire hydrant system inside the buildings and works and water supply system outside the buildings after being installed must be tested their operation of entire system. These systems are only put into operation when the testing result indicates that they have fully met all requirements for design and relevant standards.

8.3.2. Checking the water reserve for firefighting in tanks and operating the main fire pump and standby fire pump once a week.

8.3.3. Checking the fire hydrants, the tightness of the connector when fitted together, the shutdown and opening of all valves and performing trial spray of one third of total fire hydrants once for at least 6 months.

8.3.4. Conducting trial spray to test the quality of hoses, connectors, nozzles equipped; cleaning all opening and closing valves and nozzles; replacing equipment of bad quality.

8.3.5. The fire hydrant system inside the buildings and works and water supply system outside the buildings are technically maintained periodically by the manufacturers' instruction no more than once a year.

9. Equipment, placement, checking and maintenance of motor means of firefighting

9.1 Equipment and placement of motor means of firefighting

9.1.1. The large warehouses, airports and seaports, key economic, political, social- cultural establishments and industrial parks, in addition to the equipment of firefighting system, they are required to be equipped with fire trucks and ships using both water and foam for firefighting. The subjects and minimum equipment norms are prescribed in Table 6.

Table 6 - Subjects and minimum equipment norms of motor means of firefighting

No.	Subject	Size	Fire truck, unit	Mobile fire pump
1	Warehouse			
1.1	Stockpile	National level	1	
1.2	Stockpile	Ministerial and agency level		1
1.3	Oil depot and petroleum products	Total capacity of over 100,000 m ³	2	
1.4	Oil depot and petroleum products	Total capacity from 15000 to 100,000 m ³	1	
1.5	Oil depot and petroleum products	Total capacity of less than 15,000 m ³		1
2	Airports, seaports			
2.1	Airports	International	3	
2.2	Airports	Domestic	2	
2.3	Seaports	Type I	2	
2.4	Seaports	Type II	1	
2.5	Other domestic ports			1
3	Production establishments			
3.1	Thermal Power Plant	Capacity from 200 MW or higher	1	
3.2	Hydropower Plant	Capacity from 300 MW or higher	1	
3.3	Thermal power plant and hydropower plant	Having capacity smaller than the above one		1
3.4	Nuclear Power Plant	No dependence on capacity	2	

3.5	Paper Mill	Capacity over 35,000 tons / year	1	
3.6	Textile Factory	Capacity of over 20 million m ² per year	1	
3.7	Cement Plant	Capacity of over 1 million tons per year	1	
3.8	Fertilizer plant	Capacity from 180 000 tons / year or more	1	
3.9	Steel factory	Capacity of 300,000 tons of steel / year or more	1	
3.10	Paper mill, textile factory, cement plant, fertilizer plant, steel factory	Having capacity smaller than the above one		1
3.11	Oil and Petrochemical refinery	No dependence on capacity	2	
3.12	Gas processing facility	Capacity from 15 million m ³ of gas / day and night or more	1	
3.13	Mining facility	Capacity of 300,000 tons / year or more	1	
3.14	Gas processing and mining facility	Having capacity smaller than the above one		1
4	Industrial park			
4.1	Industrial park	Total area of over 300 ha	3	
4.2	Industrial park	Total area of over 150 to 300 ha	2	
4.3	Industrial park	Total area of over 50 to 150 ha	1	
4.4	Industrial park	Total area of less than 50ha		1

9.1.2. Seaports of class I and class II are equipped with at least 01 fire ship.

9.1.3. The equipment of fire truck, ship and mobile fire pump for buildings and works not listed above will be regulated by the competent fire prevention and fighting authorities.

9.1.4. The fire truck, ship and mobile fire pump equipped for buildings and works must meet the following requirements:

a) Having technical specifications and features of firefighting in accordance with the type of buildings and works to be protected.

b) Having extinguishant, means and attached tools and equipment in accordance with regulations.

9.1.5. Fire truck and mobile fire pump and other fire equipment attached to truck and pump must be placed in the roofed house (garage).

9.1.6. Arrangement of berths for ships must ensure the requirements for quick mobile firefighting without other obstructions or obstacles.

9.2. Checking and maintenance of motor means of firefighting

9.2.1. Fire truck, ship and mobile fire pump are checked and maintained regularly to ensure they are always good operation under technical specification of the manufacturer.

9.2.2. Fire truck, ship and mobile fire pump must be loaded with enough fuel, extinguishant and fully attached equipment and tools.

9.2.3. Fire truck, ship and mobile fire pump are checked and maintained regularly and periodically and irregularly. The contents of checking and maintenance are in accordance with the manufacturers' regulations.

10. Equipment, placement, checking and maintenance of means of rescue, means of emergency lighting and emergency exit instructions, conventional demolition tools and protection means against smoke

10.1. Equipment, placement of means of rescue, means of emergency lighting and emergency exit instructions, conventional demolition tools and protection means against smoke

10.1.1. Apartment buildings, hotels and other types of buildings from 25 m high or more with more than 50 people on a storey must be equipped with means of rescue. The equipment of type of rescue means for each specific project will be decided by the the competent fire prevention and fighting authorities

10.1.2. Means of rescue equipped must ensure the requirements for safety technique in accordance with the manufacturers' regulations and conditions of use.

10.1.3. The installation of the mounting and hooking structures, for rope rescue, ladder, rescue tube must conform to the fire limits, load, height and safe rescue capacity. The place for installation of means of rescue must be in line with the technical requirements and features of use of the means.

10.1.4. The means of emergency lighting and emergency exit instructions are equipped on the exit way of the buildings and works in the following areas:

- a) At dangerous places for the movement of people;
- b) In the passage-ways and on the stairs for escape for people when a number of people in need of escape is more than 50;
- c) In the main passage-ways and exit door of the production rooms, in which the number of people working is more than 50 people;
- d) At the staircase instruction position in residential building with a height of more than 6 storeys.
- dd) In the public rooms and ancillary houses industrial enterprises, if the number of people gathering more than is 100 people at the same time;
- e) In production rooms without natural light.

10.1.5. The emergency light and exit light should have a redundant power supply to ensure a minimum operation time of at least 2 hours.

The emergency light has initial light intensity of 10 lux on average and the minimum light intensity at any point of time along the escape way measured not less than 1 lux.

The exit light must be clearly visible to the word "EXIT" or other appropriate word from a minimum distance of 30 meters in normal lighting conditions (300 lux) or upon occurrence of incident (10 lux).

10.1.6. The emergency light and exit light are installed and placed above the doors, corridors, staircases, fire escape staircases, turnouts on the fire escape way for lighting and instruction of passage-way and easy observation. The installation placement between emergency lights and exit lights must be visible to escape and the distance is not larger than 30 m.

10.1.7. Equipped with at least one set of conventional demolition tool for buildings and works; placing at the areas on duty of fire prevention and fighting as follows:

- a) Production building;
- b) Warehouse;
- c) Dormitories, hotels, condominiums and restaurants;
- d) Administrative offices, schools and hospitals;
- dd) Railway stations and other public works;

e) Theatres, cinemas, halls, clubs, dancing halls;

f) Markets and solid and semi-solid commercial centers.

10.1.8. Means of protection against smoke are equipped for hotels and placed in rooms at conspicuous and accessible places. Equipping one person with at least a filter mask, encouraging the additional equipment of chemical respirator.

10.1.9. There are escape signposts and indication signs of installation of rescue means in fires at observable places.

10.2. Checking and maintenance of means of rescue in fire, means of emergency lighting and emergency exit instructions, conventional demolition tools and protection means against smoke

10.2.1. The means of rescue in fire, means of emergency lighting and emergency exit instructions, conventional demolition tools and protection means against smoke must be periodically checked once a month

10.2.2. Once a year, the means of rescue in fire, means of emergency lighting and emergency exit instructions are checked and maintained in accordance with the procedures and technical requirements of each means. The emergency light and exit light are tested within 2 hours. The means failing to guarantee the working time must be replaced.

10.2.3. Conventional demolition tools are checked once for every 6 months.

10.2.4. Means of rescue in fire, means of emergency lighting and emergency exit instructions decorating buildings and works must be preserved from rain, sun and moisture.

11. Equipment, placement, checking and maintenance of rudimentary firefighting tools

11.1. Equipment and placement of rudimentary firefighting tools

11.1.1. The rudimentary firefighting tools are equipped for oil depots and petroleum products, oil and liquefied natural gas business stores, markets, warehouses, production facilities and family houses.

11.1.2. Equipment of rudimentary firefighting tools for oil depots and petroleum products, petroleum stores and petroleum works are specified in TCVN 5307, TCVN 4530, TCVN 5684.

11.1.3. Equipment of rudimentary firefighting tools for warehouses, stores and production buildings are specified in Table 7.

Table 7 - Equipment of rudimentary firefighting tools

No.	Name of works items	Sand barrels, m ³	Fiber mattress 1m x 2m, unit	Water tank 200l, unit
1	Warehouses, shops containing goods are non-flammable solid materials			1/500m ² floor
2	Warehouses, shops containing goods are flammable solid materials, including liquid ignition temperature greater than 45 ⁰ C, but contained in sealed box with a volume less than 500 kg	1/350m ² floor	1/350m ² floor	1/350m ² floor
3	Warehouses, stores containing equipment, automobiles, motorcycles			1/200m ² floor
4	Production and processing facilities using mechanical equipment, ovens, welding machine		1/200m ² floor	1/200m ² floor
5	Facilities producing, packing, classifying and preserving goods without use of fire	1/300m ² floor	1/300m ² floor	1/300m ² floor

11.1.4. For other facilities, the equipment of rudimentary firefighting tools will depend on the conditions and requirements of each facility.

11.1.5. Means of rudimentary firefighting are placed in each area in accordance with requirements for firefighting use. Each water container fore firefighting has at least 2 buckets (or bins). Each container of sand has at least 2 shovels.

The sand or water containers are covered so as to avoid dirty things to fall into them.

11.1.6. Means of rudimentary firefighting: long-handled sickle, tinder, bamboo ladder, shovels, bucket or bin, water container, sand bin, hand pump need to be painted red.

11.2. Checking and maintenance of means of rudimentary firefighting

11.2.1. The means of rudimentary firefighting are periodically checked and maintained once for every 6 months.

11.2.2. Water or sand containers for firefighting must be always full of water and sand or not less than 4/5 of the containing volume. Sand preserved must always dry without dirty objects. If seeing that the volume of water or sand is improper, it is necessary to add it. Replacing with new sand or water if it is not guaranteed for firefighting.

ANNEX A

(Reference)

Monitoring book of means of fire prevention and firefighting

Cover page

Socialist Republic of Vietnam

Independence – Freedom – Happiness

MONITORING BOOK OF MEANS OF FIRE PREVENTION AND FIREFIGHTING

Name of facility :

.....
.....
.....

Address:

.....

Tel: Fax:

Book made on date month year

Book maker:

Person in charge of fire prevention and fighting of the facility:

.....

Page 2, 3, 4

Summary of means of fire prevention and fighting

No.	Date, month, year (checking or put into use)	Type of means or system of prevention and fighting	Symbol	Amount	Unit	Technical conditions	
						Satisfactory	Unsatisfactory

Page 5,6...(and the following pages)

Monitoring book of technical condition of each type of means (or system) of prevention and fighting

Works items:

.....

Means of fire prevention and fighting, type:

at position No.:(or code of means prescribed by management agency)

No.	Date, month of checking	Checking content and result	Method of checking	Conclusion	Person or agency checking	Signature	Note

ANNEX B

(Reference)

Form of monitoring card of checking result of means of fire prevention and fighting

<p>Monitoring card of checking result of means of fire prevention and fighting</p> <p>Name of means: </p> <p>Symbol: Serial No. </p>

	<ul style="list-style-type: none"> - Films, pictures and video tapes in non-flammable packing with storage volume of 200 kg or more, and any volume in inflammable packing; - Materials and semiconductors, IC and other electronic components; - Motor, machinery, gap-bridging equipment including fuel and oil; - Materials and goods of production class C on fire danger preserved on shelf of 5.5 m high or more. 	
1.2	Preservation warehouse of natural rubber, synthetic rubber and rubber products	
1.2.1	One-storey building	Total construction area of 750m ² or more
1.2.2	Building with one storey or more	No dependence on constructional area
1.3.	Preservation warehouse with two storeys or more preserving materials and goods of production class C on fire danger (excluding cases specified at Point 1.1 and 1.2)	No dependence on constructional area
1.4	Archives, libraries, preservation of statistic documents, handwritten historical documents and other valuable documents	No dependence on constructional area
1.5.	Building of 25m or more (excluding production building of production class D and E)	No dependence on area
1.6.	1-storey steel frame building with metal roof:	
1.6.1	Public (*), collective, civil	Area of 800 m ² or more
1.6.2	Commercial (**)- Administrative	Area of 1200 m ² or more
1.7	Business building (**) (No installation of automatic firefighting system at areas of preservation and preparation meat, fish, vegetables and fruits in non-flammable packing; metal plates and bowls, non-flammable materials)	
1.7.1	Underground	Area of 200m ² or more

1.7.2	One-storey building (excluding subjects specified at point 1.6)	Area of 3500m ² or more
1.7.3	Two-storey building	Area of 3500m ² or more
1.7.4	Three-storey building	No dependence on area
1.7.5	Business building of ignitable and inflammable liquid (excluding gas-station and solution contained in cans with volume of less than 20l of each can)	No dependence on area
1.8	Cultural building and combination (including cultural combination of combination of production building, warehouse and residential building)	No dependence on area and number of storeys
1.9	Exhibition and advertisement building:	
1.9.1	One-storey building	Area from 1000 m ² or more
1.9.2	Building with two storeys or more	No dependence on area
2. Works		
2.1	Cable works (cellars, trays, tunnels, wells, double floor, frame, casing ... used to wire power cables or communication cables) of the power plant.	No dependence on area
2.2	Other cable works with the voltage of 500 kV or higher	No dependence on area
2.3	Cable works with the voltage of 110KV connected to a transformer with a capacity of 63 KVA and above	No dependence on area
2.4	Works of connection cable of production buildings and civil buildings	Over 100 m ³
2.5	Mixed cable cellar of production buildings and civil buildings in which cable or conductor with voltage of 220 V, the volume of cable cellar over 100 m ³ with a number of cable:	12 strands or more
2.6	Closed or open conveyors transporting flammable materials	25 m long or more
2.7	Installation of suspended ceiling (Part of technical space) to install ventilation tube and water supply pipe and cable tray with more than 12 cable strands and a voltage of 220 V or higher insulated by flammable and non-	No dependence on area and volume

	flammable (including the wiring on the same holder)	
2.8	Petroleum store and tanks of inflammable and combustible liquid	According to TCVN 4530, TCVN 5307, TCVN 5684.
3. Room and chamber		
3.1. Room and chamber used for storage or production		
3.1.1	Under production class A and B (excluding building of processing and preservation of agricultural grains)	Area of 300m ² or more
3.1.2.	Containing, storage and production materials and rubber products, wood (cellulose), sulphur, alkali metals, semiconductor materials, micro-circuits and other electronic components. Materials and products from wool, felt, leather, film, pictures and video tapes made from combustible materials.	No dependence on area
3.1.3	Under production class C (excluding cases specified in 3.2):	
3.1.3.1	In mezzanine or basement	No dependence on area
3.1.3.2	On the other storeys above ground	Area of 300m ² or more
3.1.4	Preservation and production of materials and products from aluminum ore, rubber adhesive, combustible and inflammable liquid products such as solvents, paints, adhesives, mastics, impregnation liquid, coating chamber, synthesis of synthetic rubber, compressors with gas turbine engines, oil and diesel oil heating chamber	No dependence on area
3.1.5	High voltage testing chamber, chamber partitioned by combustible materials	No dependence on area
3.2. Dynamic room and chamber		
3.2.1	Transformer and compensator chamber from or 500KV or higher	No dependence on area
3.2.2	Transformer chamber with a voltage from 220 to 230 KV with capacity of each transformer from 200 MVA or higher	No dependence on area
3.2.3	Transformer chamber and circuit breaker in closed container:	

3.2.3.1	With capacity of 63 MVA or more	No dependence on area
3.2.3.2	With a voltage of 110 kV or higher	No dependence on area
3.2. Communications room or chamber		
3.3.1	Technical workshops of the terminal equipment, intermediate switching room, radio signal transmission and receiving center	No dependence on area
3.3.2	Digital switch chamber, telephone control center, computer and telegraph center of post office of provinces and cities with a total building area of 40,000 m ³ or more	No dependence on area
3.3.4	Automatic switchboard with capacity of 10,000 subscribers, channels or junctions	No dependence on area
3.3.5	Division and connection room with computer use to control automatic switchboards with capacity from 10,000 inter-provincial and municipal channels or more.	Area of 24m ² or more
3.3.6	Room of handling, sorting, storage, packaging of letter, telegrams, telegraphs, newspapers	Area of 500m ² or more
3.4. Room and chamber of transport		
3.4.1	Room and chamber used for manufacturing, repairing and processing train (electrical machines and equipment, repair and processing wagons, wheels, engines ...	No dependence on room and chamber area
3.4.2	Room and component works of the subway system (excluding the way of passenger carrying transfer station, battery room, water pump station, heating appliance, ventilating chamber)	No dependence on room and chamber area
3.4.3	Traffic control center with automatic systems, medium and high frequency radio communications center	No dependence on room and chamber area
3.4.4	Disassembly and installation room of aircraft engine, flight equipment, chassis and aircraft and helicopter wheels Room removable aircraft engines, flight equipment, and Isaac si wheel aircraft, helicopters	No dependence on chamber area
3.4.5.	Repair and manufacturing room of aircraft engine	No dependence on room and chamber area

3.4.6	Room for placement of vehicles in a number of works (excluding in residential building):	
3.4.6.1	Basement (including under bridges)	No dependence on room and chamber area
3.4.6.2	Mezzanine and overground floor	3 automobiles or more
3.4.7	Subway stop way with technical maintenance	4500m ² or more
3.5. Public performance room		
3.1.5	Preservation and transaction room of large volume of publications, documents, manuscripts and other valuable materials (including records of the operating room)	No dependence on area
3.5.2	Library archive with reserve of 500 000 units of books and documents or more	No dependence on area
3.5.3	Exhibition space	Area of 1 000 m ² or more
3.5.4	Preservation and display room of value works of art and articles of museum	No dependence on area
3.5.5	Room and chamber with cultural and art functions:	
3.5.5.1	Cinemas, clubs, theaters with size of stage 21m x 15m, regardless of the number of audience or stage with smaller size for design number of more than 700 audiences	No dependence on area
3.5.5.2	Concert room or combination of concert and movie with 800 seats or more	No dependence on area
3.5.5.3	Warehouse: props, scenery, stage tools, studio	No dependence on area
3.5.5.4	Studio	Area of 1 000 m ² or more
3.5.5.5	Preservation room of baggages, flammable material storage at railway station (including airport) arranged on storeys:	
3.5.5.5.1	Basement, underground floor	No dependence on area
3.5.5.5.2	Overground floor	Area of 300 m ² or more
3.5.5.6	Preservation chamber and room of flammable or non-flammable materials in burnable packing placed at:	
3.5.5.6.1	Under grandstand of roofed sports building	Area of 100 m ² or more

3.5.5.6.2	In roofed sports building with capacity of 800 seats or more	Area of 100 m ² or more
3.5.5.6.3	Under grandstand of outdoor sports building with capacity of 3000 seats or more	Area of 100 m ² or more
3.5.5.7	Master computer room, communications, preservatio of magnetic board, archival paper tape, recording equipment, technical room below the stage and studio.	No dependence on area
3.5.5.8	Chamber, commodity trading space in other performance buildings (residential or public building....) placed in:	
3.5.5.8.1	Mezzanine and basement	Area of 200m ² or more
3.5.5.8.2	Other overground floors	Area of 500m ² or more
4. Equipment		
4.1	There are coating chambers using ignitable or flammable liquid.	No dependence on type of equipment
4.2	There are drying chambers	No dependence on type of equipment
4.3	Recovery tower of flammable waste	No dependence on type of equipment
4.4	Transformer cooled with oil with a voltage:	
4.4.1	A voltage of 500 KV	With any capacity
4.4.2	A voltage from 220 KV to 330KV	With capacity of 200 MVA or more
4.4.3	A voltage of 110 KV installed in hydropower plant	Capacity of generator is 63 MVA or more
4.5	Oil circuit-breaker in closed distribution equipment	With volume of oil from 60 kg or more
4.6	Electric power substations using diesel or gas generators designed on automobile or trailer	No dependence on area
4.7	Shelves with the height of over 5.5 m for preservation of flammable or non-flammable materials contained in burnable packing	No dependence on area
4.8	Tanks containing oil with containing capacity	3m ³ or more
NOTE:		
(*)Public buidling, ex: school, hospital, cultural and sports house...		

(**) Building used for business, commerce or entertainment, for ex: market, commercial center, dancing hall...

DIRECTORY OF REFERENCE

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