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OF ITU

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SERIES L: CONSTRUCTION, INSTALLATION AND  
PROTECTION OF CABLES AND OTHER ELEMENTS  
OF OUTSIDE PLANT

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**Fire extinction – Classification and location of  
fire extinguishing installations and equipment  
on premises**

ITU-T Recommendation L.23

(Previously CCITT Recommendation)

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ITU-T L-SERIES RECOMMENDATIONS  
**CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF  
OUTSIDE PLANT**

*For further details, please refer to ITU-T List of Recommendations.*

## FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation L.23 was prepared by ITU-T Study Group 6 (1993-1996) and was approved by the WTSC (Geneva, 9-18 October 1996).

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## NOTES

1. In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.
2. The status of annexes and appendices attached to the Series L Recommendations should be interpreted as follows:
  - an *annex* to a Recommendation forms an integral part of the Recommendation;
  - an *appendix* to a Recommendation does not form part of the Recommendation and only provides some complementary explanation or information specific to that Recommendation.

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## **FIRE EXTINCTION – CLASSIFICATION AND LOCATION OF FIRE EXTINGUISHING INSTALLATIONS AND EQUIPMENT ON PREMISES**

*(Geneva, 1996)*

### **1 Introduction**

The different functions taking place in a telecommunication building generates possibilities and provides strong causes for fires on the premises. Fire extinction action involves concentrating the fire fighting at the origin of the fire inside the building itself using a choice of extinguishing systems.

The fire-fighting means to be adopted in a telecommunication building, may vary according to the usage and location of the premises and whether it is occupied. These are factors which determine the amount of fire service assistance initially allocated in case there should be a fire.

#### **1.1 Portable equipment**

This includes transportable or movable fire-fighting devices, such as portable extinguishers, fire blankets, etc. and other equipment assisting personnel in fire fighting such as masks, insulated garments, etc.

Portable fire extinguishers use water, gas, foam or powder as an extinguishing medium. The type of extinguishing media selected will depend on:

- whether electrical equipment is being protected;
- whether the area is confined or open;
- whether the fire will involve solid materials of an organic nature;
- whether the fire will involve liquids or liquefiable solids.

#### **1.2 Fixed installations**

These are non-transportable fire-fighting fixtures that are fixed extinguishing installations incorporated into the building and other accessory installations, such as hydrants, water supply networks, water spraying installations, sprinklers, automatic powder or gaseous extinguishers, water hoses, etc.

##### **Hydrant systems, hose reels and foam inlets**

These are non-transportable fire-fighting fixtures which while not responding automatically to a fire should be available at strategic points for use by the fire service.

Hydrant systems (wet and dry rising and falling mains) are intended for use by the fire service or other trained personnel and provide a readily available means to deliver considerable quantities of water to extinguish or prevent the spread of fire.

Hose reels while delivering smaller quantities of water are capable of operation by the administration's personnel who are in the vicinity when a fire starts and can be used to tackle a fire in its early stage of development. They provide a continuous and easily controlled water jet and are generally more effective than portable fire extinguishers and less damaging than larger jets.

Foam inlets have a more specialized role for use where quantities of oil are involved.

##### **Water sprinkler systems**

A sprinkler system consists of a water supply and an array of closed outlets or sprinklers mounted on pipework beneath the ceiling of a protected enclosure. The sprinklers operate at predetermined temperatures with the flow of water through an alarm valve initiating a fire alarm. Only sprinklers in the vicinity of the fire operate.

## **Carbon dioxide systems**

There is a central source where the gas is stored under pressure and pipework is provided to carry it to the points of discharge. Systems provide either total flooding or local application.

Total flooding systems are used to protect against either surface fires involving flammable liquids, gases and solids or deep-seated fires involving solids subject to smouldering.

Local application systems are used where the hazard does not meet the total flooding enclosure requirements or as an addition to buildings in which sprinkler systems are installed.

Carbon dioxide systems can be used for fires on low voltage live electrical equipment.

## **Halon gas systems (subject to national legislation)**

As this gas is electrically non-conductive, it is used on fires involving live electrical apparatus and to protect electronic data processing installations.

## **Powder systems**

Powders are finely divided chemicals with a controlled range of particle size which are used mainly to extinguish fires involving flammable liquids, gases and solids.

Powder systems can be used for fires on high voltage live electrical equipment.

## **2 It is recommended that**

Fire extinction can involve a number of systems which are mutually supportive although each may be independent of the others. The success of one or more systems may make unnecessary or reduce the need for the others. The systems are:

- *First-aid fire fighting*  
This involves the use of portable extinguishers, hose reels and fire blankets.
- *Fixed fire extinguishing systems*  
These involve water sprinkler, gaseous or powder systems.
- *Action by the fire service*  
This involves using their own equipment and/or using non-transportable fire-fighting fixtures, such as hydrants, hose reels and foam inlets.

Fire sectors should be established in telecommunication buildings. The buildings should be classified for the fire service according to their complexity.

Portable fire extinguishers should be placed in all telecommunication buildings. The type should be appropriate for the fire risk.

Fire sectors should be established that can be equipped with fixed extinguishing installations.

### **2.1 Portable equipment**

Portable fire extinguishers should be placed in positions that are easily seen and with easy access. They should be protected against solar heat and be kept away from internal sources of heat such as radiators and heating pipes.

Portable fire extinguishers, appropriate for the fire risk, should be evenly distributed on each floor of the building with a maximum travel distance which should be specified. They should be hung on walls or placed on dedicated stands so that their locations are fixed and can be memorized.

Each extinguisher should be marked with its capacity and the type of fire suitable for its extinguisher medium.

When a fire sector is equipped with more than one type of extinguisher, these should be distributed evenly and alternatively through the area.

Subject to national legislation, the extinguishers should be periodically test-discharged which also provides an opportunity for training personnel in their use.

## 2.2 Fixed installations

Fixed automatic extinguishing systems should be installed:

- in unmanned buildings or those where the arrival of the fire service is considered too delayed;
- on sites of high strategic value to the Administration because of personnel, equipment or documentation content.

With the exception of water sprinkler systems, fixed extinguishing systems should be triggered by automatic fire-detection systems. Preferably, the extinguishing agent is only released when at least two detectors are activated. Access should be prohibited to a compartment if the extinguishing agent is hazardous to personnel and the system is in automatic operation mode. It should be possible to operate the system from outside the compartment (fire sector).

Water sprinkler systems are operated by the triggering of individual heads detecting a predetermined local rise in temperature.

Water hydrants should be placed in areas easily accessible to the fire service and should be clearly marked. Dry rising mains should be installed in buildings up to a specified height (for example, 60 m above ground level). Above this height, wet rising mains should be used owing to the pressure necessary to provide adequate water supplies. Water inlets should be placed on the facade of buildings and should be well marked. Outlets for the dry and wet rising mains should be installed in stair wells or in access halls close by (for example, on even-numbered floors). Dry dropping mains are installed in buildings for floors more than a specified depth (for example, 10 m below ground level).

Water hose reels should be located in prominent and accessible positions at each floor level adjacent to exits in corridors on exit routes. Sufficient hose reels should be provided so that the nozzle of a hose can be taken into every room and with the whole area of each room being covered by the water jet.

## Appendix I

### United Kingdom experience

#### United Kingdom Standards

British Standard (BS) 5306: Part 1  
Fire extinguishing installations and equipment on premises  
Part 1 – Hydrant systems, hose reels and foam inlets

British Standard (BS) 5306: Part 2  
Fire extinguishing installations and equipment on premises  
Part 2 – Specification for sprinkler systems

British Standard (BS) 5306: Part 3  
Fire extinguishing installations and equipment on premises  
Part 3 – Code of practice for selection, installation and maintenance of portable fire extinguishers

British Standard (BS) 5306: Part 4  
Fire extinguishing installations and equipment on premises  
Part 4 – Specification for carbon dioxide systems

British Standard (BS) 5306: Section 5.1  
Fire extinguishing installations and equipment on premises  
Part 5 – Halon systems, Section 5.1 Specification for Halon 1301 total flooding systems

British Standard (BS) 5306: Section 5.2  
Fire extinguishing installations and equipment on premises  
Part 5 – Halon systems, Section 5.2 Halon 1211 total flooding systems

British Standard (BS) 5306: Part 6  
Fire extinguishing installations and equipment on premises  
Part 6 – Specification for foam systems

British Standard (BS) 5306: Part 7  
Fire extinguishing installations and equipment on premises  
Part 7 – Specification for extinguishing powder systems

## Appendix II

### Japanese experience

#### Japanese Standards relating to Fire Extinguishing Equipment

##### *Fire extinguishers and basic extinguishing equipment*

Fire Law Enforcement Ordinances: Clause 10  
Fire Law Enforcement Regulation: Clauses 6-11

##### *Indoor fire hydrant installations*

Fire Law Enforcement Ordinances: Clause 11  
Fire Law Enforcement Regulation: Clause 12

##### *Sprinkler installations*

Fire Law Enforcement Ordinances: Clause 12  
Fire Law Enforcement Regulation: Clauses 13-15

##### *Water sprayer extinguishing installations*

Fire Law Enforcement Ordinances: Clauses 13 and 14  
Fire Law Enforcement Regulation: Clauses 16 and 17

##### *Foam extinguishing installations*

Fire Law Enforcement Ordinances: Clauses 13 and 15  
Fire Law Enforcement Regulation: Clause 18

##### *Carbon dioxide fire-extinguishing installations*

Fire Law Enforcement Ordinances: Clauses 13 and 16  
Fire Law Enforcement Regulation: Clause 19

##### *Halogenated fire-extinguishing installations*

Fire Law Enforcement Ordinances: Clauses 13 and 17  
Fire Law Enforcement Regulation: Clause 20

##### *Powdered fire-extinguishing installations*

Fire Law Enforcement Ordinances: Clauses 13 and 18  
Fire Law Enforcement Regulation: Clause 21

##### *Outdoor fire hydrant installations*

Fire Law Enforcement Ordinances: Clauses 13 and 19  
Fire Law Enforcement Regulation: Clause 22

##### *Power-driven fire-fighting pump installations*

Fire Law Enforcement Ordinances: Clause 20



## Appendix III

### Argentinian experience

IRAM are the initials of National Institute of Rationalization and Materials – Member of ISO (International Organization for Standardization) – COPANT (Panamerican Commission of Technical Rules).

NORMA IRAM 3509:1983	MATAFUEGOS DE DIÓXIDO DE CARBONO Manuales; (REV IRAM 3509:1967 (Prescrip. adicionales 84/12) (MOD. N° 1:88/08)
NORMA IRAM 3523:1983	MATAFUEGOS DE POLVO BAJO PRESIÓN Manuales; (REV IRAM 3523:1973) (Sanción IRAM 3523:1981 DE EMERG.), (Prescripciones adicionales: 84/12). (MOD. N° 1:86/07 y MOD. N° 2:88/08). ERR de MOD. N° 88/06).
NORMA IRAM 3540:1983	MATAFUEGOS DE BROMOCOLORODIFLUOROMETANO (BCF) BAJO PRESIÓN Manuales, (Prescripciones adicionales: 84/12). (MOD. N° 1:86/07 y MOD. N° 2: 88/08)
NORMA IRAM 3549:1984	MANGAS PARA EXTINCIÓN DE INCENDIOS Métodos de ensayo (MOD. N° 1:89/06) (ERR. N° 1:89/06)
NORMA IRAM 3555-2:1990	INSTALACIONES FIJAS CONTRA INCENDIO. SISTEMAS DE ROCIADORES AUTOMÁTICOS DE AGUA Componentes
NORMA IRAM 3556:1988	INSTALACIONES FIJAS CONTRA INCENDIO Sistemas de extinción. Dispositivos eléctricos de control
NORMA IRAM 3594:1989	MANGAS PARA EXTINCIÓN DE INCENDIOS Cuidado, uso y mantenimiento de las mangas, incluidas las conexiones y las lanzas
NORMA IRAM 3596:1991	INSTALACIONES FIJAS CONTRA INCENDIO Rociadores automáticos
NORMA IRAM 3597:1989	INSTALACIONES FIJAS CONTRA INCENDIO Sistemas hidratantes
NORMA IRAM 3632:1991	INSTALACIONES FIJAS CONTRA INCENDIO Sistemas de extinción a base de dióxido de carbono (CO <sub>2</sub> )
NORMA IRAM 3635:1991	INSTALACIONES FIJAS CONTRA INCENDIO Sistemas de extinción a base de Halón 1301

## Appendix IV

### United States experience

#### IV.1 Building construction

United States model building codes: in the United States, there are several different building codes. Different codes are adopted in different areas of the country. The three major building codes are:

- national building code;
- standard building code;
- uniform building code.

#### IV.2 Fire prevention

United States model fire prevention codes: in the United States, there are several different fire codes. Different codes are adopted in different areas of the country. The three major fire prevention codes are:

- national fire prevention code;
- standard fire prevention code;
- uniform fire prevention code.

#### IV.3 Fire system installation and related codes

United States National Standards: National Fire Protection Association (NFPA) – National Fire Codes.

#### IV.4 Telecommunications Equipment Fire Resistance Standards

United States National Standards: American National Standards Institute (ANSI) Standard T1.307, Fire Resistance Criteria.

#### Summary of Fire Safety Regulations in the United States

In the United States, little fire protection is federally mandated. Employers are required to provide a safe working environment, but the protection from fire is not specified.

Regulations are mandated by state or local jurisdictions. Rather than actually writing the codes from beginning to end, most jurisdictions elect to adopt one of the three model code series. A series includes building, plumbing, mechanical, and fire prevention regulations. The three model code series are:

- 1) The National Code series which, among others, includes the National Fire Prevention Code and National Building Code developed and published by the Building Officials and Code Administrators (BOCA).
- 2) The Standard Code series which, among others, includes the Standard Fire Prevention Code and Standard Building Code developed and published by the Southern Building Code Congress International (SBCCI).
- 3) The Uniform Code series which, among others, includes the Uniform Fire Code and the Uniform Building Code developed and published by the International Fire Code Institute (IFCI).

Membership in these organizations is open, but voting privileges on code changes and related issues are reserved for registered building and fire officials.

The National Code series is adopted in the north-east and part of the mid-west of the United States. The Standard Code series is adopted by the south-eastern states of the United States. The Uniform Code series is adopted by almost all of the states west of the Mississippi River.

The three model code organizations are moving towards developing one code. A joint organization has been created called the International Code Council (ICC) with the responsibility of developing one unified code. The Board of the ICC is made up of 12 seats with four allotted to each of the model code organizations.

So far, the ICC has developed and published a unified Model Plumbing Code which is now available for adoption. They have plans to come out with unified Model Mechanical, Building and Fire Prevention Codes by the year 2000.

Other organizations also develop and publish standards and codes. These are available for adoption by the Model Code Organizations or by the States directly. The one that develops the fire prevention and protection standards and codes is the National Fire Protection Association (NFPA).

## ITU-T RECOMMENDATIONS SERIES

- Series A Organization of the work of the ITU-T
- Series B Means of expression: definitions, symbols, classification
- Series C General telecommunication statistics
- Series D General tariff principles
- Series E Overall network operation, telephone service, service operation and human factors
- Series F Non-telephone telecommunication services
- Series G Transmission systems and media, digital systems and networks
- Series H Audiovisual and multimedia systems
- Series I Integrated services digital network
- Series J Transmission of television, sound programme and other multimedia signals
- Series K Protection against interference
- Series L Construction, installation and protection of cables and other elements of outside plant**
- Series M Maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
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- Series O Specifications of measuring equipment
- Series P Telephone transmission quality, telephone installations, local line networks
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- Series U Telegraph switching
- Series V Data communication over the telephone network
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- Series Z Programming languages