



**LATAM PCI**  
Red Latinoamericana de Protección Contra Incendio

# STATE OF THE REGULATION

On Protection Against  
Fire in Latin America  
*First Approach*

This document describes the questions, answers, analysis and conclusions of two questionnaires conducted to ascertain the status of fire protection regulation in the region.

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*Regulatory Commission - Red Latam PCI  
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# SUMMARY EXECUTIVE

This document supports and describes the questions, answers, analysis and conclusions of two questionnaires conducted by the Latin American Fire Protection Network - Latam PCI, to its associated organizations and institutions; initiative implemented to know the status of fire protection regulation in the region.

The main purpose of the first questionnaire was to identify the existence and type of development of fire codes or fire protection requirements in different countries of Latin America, as well as to obtain information about their application in new buildings for some common occupancies; The second questionnaire was oriented to establish whether the codes or other regulatory documents of the different countries that make up the Latin American Fire Protection Network - Latam PCI, contain the items and aspects on which there is a great technical consensus in defining them as minimum requirements, including the existence of the minimum requirements for fire protection in the different countries that make up the Latin American Fire Protection Network - Latam PCI: including the existence of the fundamental definitions of a classification of buildings that reflect their risks; the existence of typologies or types of fire resistant construction admissible for each building, depending on its type of occupation and other characteristics such as surface and height. This second questionnaire included specific questions on alarm and evacuation means, structural stability of buildings in case of fire, interior and exterior propagation, extinguishing means and firefighting facilities.

The main conclusions, following the analysis of the responses to the questionnaires on fire protection regulations, are presented below:

**a)** All member countries of the Latinoamerican Fire Protection Network - Latam PCI have a code or

certain regulations contained in other documents that include fire protection requirements for buildings.

**b)** The development of codes or regulations contained in other documents that include requirements on fire protection obeys to several sources, and there are no coincidences among them, with the exception of most of the regulations of Costa Rica, Ecuador and Panama, which have adopted the NFPA 101 code. The rest of the Latam PCI Network member countries have non-comparable regulations, several of which are based on NFPA code requirements, but which also incorporate some European concepts and requirements. Among the self-developed regulations are those of Brazil and Peru.

**c)** Despite their different sources, the regulations tend to use the NFPA design and installation standards or others developed based on them. Only Argentina has some design and installation standards closer to Europe.

**d)** The above analysis does not make it possible to establish the feasibility of having a common fire code in the region in the medium or long term.

**e)** All regulations are prescriptive, and there is no trend or need to incorporate performance-based requirements..

**f)** In general, regulatory problems are associated with the lack of scheduled processes for their review and updating, which are also open to all stakeholders. Only countries that have adopted the NFPA 101 code benefit from the results of the regular NFPA update process.

**g)** The participation of firefighters, whether in the development stage of codes or requirements, in their revision or in the control of their application, is also different in the countries of the PCI Latam Network.

Regardless of this, it is believed that the active incorporation of firefighters in these processes strengthens and allows for their improvement.

Although it is recognized that some of the responses to the questionnaires may have been biased or incomplete, their results reflect a perception of specialists in one or more areas of fire protection, forming a reliable and first approximation of the reality in the region..

It is important to reiterate that, based on the analysis of these results, both local results per country and global results for the region, it is possible to establish those aspects that are more deficient and of greater importance

or impact on the levels of fire protection that should be addressed, considering as a first activity a deeper and more detailed analysis of the evaluated aspect, in order to ratify the perception obtained through the questionnaires. In view of these results, both local by country and global for the region, it is possible to establish those aspects that are most deficient and have the greatest importance or impact on the levels of fire protection that should be addressed, with the first activity being a more in-depth and detailed analysis of the aspect evaluated, in order to ratify the perception obtained through the questionnaires.

## 1. INTRODUCTION

One of the main activities of the Red Latinoamericana de Protección Contra incendio - Latam PCI, which brings together different organizations and associations related to fire protection in Latin America, is to promote the improvement and development of the regulation in this area.

In order to advance in this objective, it is essential to know beforehand the current state of regulation and its application problems in each of the countries represented in the Latam PCI Network, developing for this purpose questionnaires whose answers would allow a better understanding of the local and regional panorama and, from these, propose initiatives to improve the level of fire legislation in Latin America..

To this effect, the questionnaires were oriented with the objective of forming a better defined picture of the organization and content of fire legislation in the region; the first, covering the administrative aspects of the legislation with respect to fires and, the second, the technical content of the fire regulations or codes.

This document presents a summary of the responses obtained and the main conclusions derived from their analysis..

It should be noted that the answers have been developed only by groups, organizations and associations related to the sector, without having the opinion of other segments such as regulatory authorities.

# RED LATINOAMERICANA DE PROTECCIÓN CONTRA INCENDIO



## Mission

Transform the way of facing the fire problem in Latin America, making fire protection a relevant issue from a social, technical and regulatory point of view.

## Vision

Be recognized as the agent of change and interaction that unites the fire protection industry in Latin America.

México

Costa Rica

Colombia

República Dominicana

Perú

Ecuador

Uruguay

Chile

Argentina

Paraguay

Brazil

Panamá

Guatemala

USA

## MEMBERS LATAM PCI

22

Organizations

14

Countries

700

Companies

60%

From the  
region's market

## PROBLEMS

8%

Of the world  
population

8%

Of world GDP

Less than 1% of  
sprinklers installed in  
the world

**A potential  
opportunity to  
growth**



## 2. COUNTRIES AND ORGANIZATIONS PARTICIPANTS

The countries, organizations and associations that make up the Latam PCI Network are shown in the following table.

**Table 1. Countries, organizations and associations members of the Latam PCI Network**

Country	Organization / Association
Argentina	Povensis ONG
Brazil	Instituto Sprinkler Brasil - ISB
Chile	Asociación Nacional de Protección Contra Incendios - ANAPCI
Colombia	Asociación Nacional de Protección Contra Incendios - ANRACI
Costa Rica	Colegio de Ingenieros Electricistas, Mecánicos e Industriales - CIEMI
Ecuador	Colegio de Ingenieros Mecánicos de Pichincha - CIMEPI
Mexico	Asociación Mexicana de Rociadores Automáticos Contra Incendio - AMRACI
Panama	Asociación Panameña de Protección Contra Incendio
Paraguay	Cuerpo de Bomberos Voluntarios del Paraguay
Peru	Sociedad Nacional de Protección Contra Incendios - SNPCI
Rep. Dominican	Asociación Dominicana de Protección Contra Incendios - ADPCI

obtain information, only, about fire codes and their application on new buildings for some usual occupancies.

In the context of this questionnaire, the term "code" refers to a set of mandatory rules specifying the minimum requirements that must be met when designing, constructing or renovating a building (building code), or of an incentive protection system (fire code) or other systems.

The form in which fire protection requirements are presented may vary from country to country. These codes may be federal (applicable nationwide), state or municipal in scope. In some cases, fire protection requirements are a subset of rules within a building code, while, in others, a fire code exists as a stand-alone document. However, there are cases in which such requirements are not contained in a single document, but in several.

In any case, a fire code must detail the mandatory measures according to the type of occupancy or use of the building and some of its characteristics such as height and floor area, among others, without explicitly providing how the required means of protection must be designed, installed and maintained. The latter is complemented by the existence of specific standards that the code is required to detail, which provide the criteria and specifications for designing and installing a system.

### 3.2. Questions from the first questionnaire

The questions that made up the first regulatory questionnaire on fire protection are detailed in the following table.

**Table 2. Questions from the first questionnaire**

No.	Question
1	Is there a mandatory code, with the force of law, that regulates the fire protection measures that must be complied with for new buildings?



No.	Question
2	Is this code specific to fire safety or are the requirements part of another or other major documents (such as the building code, workplace safety code, earthquake resistant building code)? Name only the main ones, indicating their requirements and in which types of occupations they apply, as well as their Federal (applies throughout the country), State, Provincial or Municipal nature.
3	Fire code requirements (specific to fire safety) or requirements of other principal document(s) may be classified as: <ul style="list-style-type: none"> <li>- It corresponds to an international code adopted in its entirety.</li> <li>- It corresponds to an international code, with modifications.</li> <li>- It is an "adaptation" of an international code.</li> <li>- The requirements have been developed in the country.</li> <li>- Another</li> </ul>
4	Which agency is responsible for developing the code or documents with requirements?
5	What body is responsible for approving the code or requirements?
6	Is there a defined schedule for revising the Code or requirements of other major documents? If so, what is the frequency?
7	Is the review process for the code or other major documents that have fire protection requirements open to the general public or professional entities? Can you describe the process?
8	Are code or major document requirements prescriptive, prescriptive, but performance-based or performance-based solutions allowed?
9	Indicate the variables that affect the type of protection required for a new building: - Building height/Number of stories. <ul style="list-style-type: none"> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Type of construction.</li> <li>- Others.</li> </ul>
10	What agency or entity is the Authority Having Jurisdiction or Jurisdiction to enforce compliance with fire code requirements or other documents with requirements?
11	Does the Competent Authority have the power to allow exceptions or non-compliance with the fire code or requirements of other principal documents? Detail the situations in which exceptions or non-compliance may be allowed.
12	Does your country's fire code or major document requirements use anyof the following concepts? <ul style="list-style-type: none"> <li>- Defines the maximum area of buildings that can be constructed without sprinklers.</li> <li>- Defines the maximum height of buildings that can be constructed without sprinklers.</li> </ul>

No.	Question
	<ul style="list-style-type: none"> <li>- It uses the "fire load" (MJ/m<sup>2</sup>) to characterize the risk of an occupation.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for sealing penetrations.</li> <li>- Defines requirements for the protection of vertical openings.</li> <li>- Defines requirements for fire protection of building structures.</li> <li>- Defines requirements to limit the use of combustible plastics and coatings.</li> <li>- Allows the use of sprinklers to reduce the requirements of other protection measures.</li> <li>- Others.</li> </ul>
13	<p>Thinking specifically about the use of sprinklers, the fire code or the requirements of other documents in your country require protection for the following new buildings:</p> <ul style="list-style-type: none"> <li>- High-rise buildings (over 23 m high).</li> <li>- Hospitals.</li> <li>- Shopping malls.</li> <li>- Commercial buildings.</li> <li>- Supermarkets.</li> <li>- Public meeting buildings.</li> <li>- Prisons or other places of confinement.</li> <li>- Hotels.</li> <li>- Residential buildings.</li> <li>- Industries.</li> <li>- Warehouses.</li> </ul>
14	<p>What are the active and passive protection systems required by the Fire Code or your country's requirements for the following new buildings?</p> <ul style="list-style-type: none"> <li>- Commercial buildings.</li> <li>- Hospitals.</li> <li>- Warehouses.</li> <li>- Industries.</li> </ul>

### 3.3. Conclusions of the first questionnaire

After the analysis of this first questionnaire, it is concluded that:

**i.** All participating countries acknowledge having codes or regulations with mandatory fire protection requirements.

**ii.** These requirements are generally contained in a specific document for fire safety with. The exceptions are: those of Chile, which are incorporated into the construction code, those of Colombia into the Seismic Resistant Construction Regulations and, in Mexico, there are requirements incorporated into the construction regulations and complementary standards.

**iii.** The codes or documents with principal requirements on fire protection are mostly national, with the exception of Brazil, Mexico and Paraguay.. In Brazil, each state is responsible for developing its own regulations, but the model is that of Sao Paulo. In Mexico, the country is divided for these purposes into states and municipalities, and although there are federal regulations, it requires the development of construction regulations and complementary technical standards by municipality, the most influential of which is Mexico City. Finally, Paraguay is divided into departments and municipalities, and an ordinance of the city of Asunción, the General Regulations for Fire Prevention and Human Safety, which is the country's model, is the General Regulations for Fire Prevention.

**iv.** Only a few countries, such as Costa Rica and Ecuador, have regulations that correspond to adaptations of an internally recognized code, NFPA

101 Life Safety Code. The rest of the countries recognize the existence of exigencies whose development corresponds to a combination of adaptation of foreign criteria, some of them European, and others of their own development.

**V.** The authorities or organizations in charge of desarrollo del código are Firefighters in Brazil and Costa Rica, while in Paraguay the Fire Department members participate in conjunction with other institutions or organizations. In the rest of the countries, ministries and other governmental entities participate in this development.

**vi.** The approval of the fire protection code or requirements depends, for the most part, on governmental or state agencies.

**vii.** With the exception of countries that have adopted a foreign code and that benefit from its revision and updating process, the rest have undefined periods for this process.

**viii.** The review processes present different levels of public participation, which depends in some cases on the willingness and will of the entities in charge of the process.

**ix.** The fire protection requirements of the participating countries are mostly prescriptive. In the case of Costa Rica and Ecuador, performance-based solutions are allowed in accordance with the adopted NFPA 101 code, while in Chile they are allowed for historic or heritage buildings and in some evacuation studies.

**x.** The variables on which the fire protection requirements are developed are common and correspond to the occupancy class, to the type and surface of the building. In some countries, the type of construction is also considered.

**xi.** In relation to the body or entity with jurisdiction to ensure compliance with the code or local fire protection requirements with, there is a high participation of firefighters. Only in Chile and Paraguay, this work does not include firefighters and depends on municipalities.

**xii.** The vast majority of the codes or requirements of the countries that responded to the questionnaire do not allow for exceptions or non-compliance.. Only Brazil and Costa Rica declare this possibility.

**xiii.** With respect to the concepts used by codes or

other major documents with requirements on fire protection, it is noted:

- The vast majority of the participating countries declare as concepts the maximum area and height of buildings that can be constructed without sprinkler systems. Chilean and Mexican regulations do not incorporate these concepts..

- Only Brazil, Chile and Mexico use the fire load concept to characterize the risk of an occupation.

- All regulations consider requirements for fire protection of building structures and interior compartmentation requirements, with the exception of Paraguay. Mexico and Paraguay state that their regulations do not incorporate the seal or treatment of penetrations through sharing elements.

- Brazil, Chile and Ecuador allow the use of spraying devices to reduce requirements for other protection measures.

- The questionnaires from Chile, Costa Rica and Mexico state that their regulations do not incorporate requirements to limit the use of combustible plastics and coatings..

- Only the regulations of Brazil, Colombia, Costa Rica, and Ecuador define requirements for the protection of vertical openings.

**xiv.** All participating countries, with the exception of Mexico, require the use of sprinkler systems, indicating that their regulations require this type of protection in some new building uses, according to the following:

- There is a consensus to require sprinklers in hospitals and shopping centers.

- For high-rise buildings, commercial buildings, supermarkets, public meeting buildings and hotels, all countries require spraying devices, with the exception of Chile.

- For prisons or other places of confinement, all regulations in the participating countries require sprinklers, with the exception of Brazil.

- The regulations in Colombia (only for sótanos and

common areas), Costa Rica, Ecuador and Paraguay incorporate residential buildings.

- Only the regulations of Colombia and Costa Rica include requirements for industries and warehouses,

while Brazil only includes requirements for warehouses. In general, the regulations contain requirements for automatic detectors as a support to life insurance, leaving the definition for these uses to the insurances.

## 4. SECOND QUESTIONNAIRE

### 4.1. Basis of the second questionnaire

The purpose of a second questionnaire corresponds to complement the vision obtained from the answers of the first questionnaire on fire safety codes in buildings in the countries of the region.

The structure of this questionnaire is oriented to this effect if the codes or other regulatory documents of the different countries that make up the Latin American Fire Protection Network - Latam PCI, contain the items and aspects on which there is a great technical consensus in defining them as minimum necessary.

These items have been classified into two groups. The first corresponds to the basic aspects that form the basis for the development of different exigencies, and this includes the definitions necessary for the understanding of concepts that support the existence and application of the requirements, the classification of buildings in terms of their use or occupancy reflecting their risks and the classification of typologies or types of fire resistant construction, admissible for each building in terms of their type of occupancy and the classification of the typologies or types of fire resistant construction admissible for each building in terms of their type of occupancy and their type of occupation. Classification of buildings in terms of their use or occupancy reflecting their risks and the classification of typologies or types of fire resistant construction, admissible for each building according to its type of occupancy and other characteristics such as surface area and height.

The second group contains the items: means of alarm and evacuation, structural stability of buildings in the event of

fire, internal propagation, external propagation, means of extinguishing and firefighting facilities, which are presented in the form: alarm and evacuation means, structural stability of buildings in the event of fire, internal propagation, external propagation, means of extinguishing and firefighting facilities. The objectives to be met in a fire protection strategy.

Each of these items contains aspects that must be considered and adequately addressed in order to achieve their objective. A graphical scheme of these groups and their items is shown in the following figure.



**Figure 1.** Items of the second questionnaire

The second questionnaire considers for the base items, questions with closed answers that indicate whether the item or aspect to be evaluated is incorporated or not in the code or other documents with requirements on fire protection, together with two evaluations to be made by the respondents of the questionnaire. The first on its treatment, which varies from 0 (not incorporated) to 5 (fully incorporated) and the second on the importance assigned to the evaluated aspect, which can be 1 (if it is of minor importance), 2 (if it is important) or 3 (if it is of critical importance).

In the case of the requirement items, it is also added for each aspect, whether or not the corresponding design, installation and maintenance standards are available to adequately implement the required aspect..

## 4.2. Summary, evaluation of responses to the second questionnaire

Based on the responses obtained, the following tables provide a summary of the responses evaluated.

**Table 3. Summary, valuation of base items**

<b>Base items</b>				
<b>Country</b>	<b>Definitions</b>	<b>Classification of occupations</b>	<b>Types of construction</b>	<b>Average</b>
Colombia	5	5	5	5,0
Ecuador	5	5	5	5,0
Panama	5	5	5	5,0
Costa Rica	4	4	5	4,7
Peru	3	3	5	3,7
Argentina	3	3	3	3,0
Brazil	3	3	3	3,0
Chile	3	3	3	3,0
Rep. Dominican	3	3	3	3,0
Paraguay	3	2	2	2,3
Mexico	3	3	0	2,0
<b>Average</b>	<b>3,6</b>	<b>3,6</b>	<b>3,5</b>	<b>3,6</b>

**Table 4. Summary, evaluation of requirement items**

Country	Base items						Average
	Alarm and evacuation means	Structural stability	Indoor propagation	External propagation	Extinguishing media	Facilities for Firefighters	
Panama	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Brazil	3,7	5,0	4,1	5,0	4,3	5,0	4,5
Peru	4,8	4,0	3,1	5,0	5,0	4,8	4,5
Ecuador	5,0	3,8	3,3	0,0	5,0	4,0	3,5
Costa Rica	3,8	4,8	4,0	1,0	2,9	3,5	3,3
Colombia	2,3	1,5	1,8	2,0	4,1	0,3	2,0
Chile	2,4	3,8	0,7	1,3	1,6	0,8	1,8
Rep. Dominican	2,4	1,5	1,7	1,0	2,3	1,5	1,7
Argentina	1,1	1,8	1,0	2,0	2,8	0,5	1,5
Mexico	1,3	0,3	0,1	0,0	2,6	0,3	0,8
Paraguay	1,1	0,8	0,4	0,0	1,7	0,0	0,7
<b>Average</b>	<b>3,0</b>	<b>2,9</b>	<b>2,3</b>	<b>2,0</b>	<b>3,4</b>	<b>2,3</b>	<b>2,7</b>

Based on the rating assigned to each item and aspect, these can be ordered in decreasing order, which allows estimating those that, as an average value, are treated in an acceptable manner, differentiated from those that are less acceptable in the region. This detail is presented in the following table.

**Table 5. List of items and aspects considered in decreasing value**

Item	Appearance	Value
Extinguishing media	Portable fire extinguishers	4,5
Means of evacuation	Signage	4,2
Means of alarm	Annunciation devices	3,7
Extinguishing media	Connections for firefighters	3,7
Extinguishing media	Hose stations	3,6
Extinguishing media	Automatic sprinklers	3,6
Base items	Definitions	3,6
Means of alarm	Manual or automatic detection systems	3,5

Base items	Classification of occupations	3,5
Base items	Types of construction	3,5
Means of evacuation	Minimum number of outlets	3,5
Means of evacuation	Travel distances	3,4
Extinguishing media	Private hydrants	3,4
Extinguishing media	Pumps for fire water networks	3,4
Means of evacuation	Location of secure outdoor areas	3,9
Means of evacuation	Lighting	3,9
Structural stability in fires	Main structural elements	3,2
Indoor propagation	Transfer of installations and treatment of openings	3,2
Extinguishing media	Fire water tanks	3,1
Means of evacuation	Occupant load values	3,0
Means of evacuation	Capacity factors	3,0
Means of evacuation	Conditions for downloading outputs	3,0
Indoor propagation	Compartmentation in fire sectors	3,0
Means of evacuation	Output protection level	2,8
Means of evacuation	Interaction with sprinkler systems	2,8
Structural stability in fires	Fire resistance of the structure	2,8
Structural stability in fires	Secondary structural elements	2,8
Extinguishing media	Public hydrants	2,8
Means of evacuation	Accessibility requirements	2,7
Indoor propagation	Compartmentalization of special risk enclosures	2,6
Means of evacuation	Type of evacuation	2,5
Means of evacuation	Alternative location of outlets	2,5
Structural stability in fires	Interaction with sprinkler systems	2,5
Indoor propagation	Protection of vertical openings	2,5
Facilities for Firefighters	Conditions of access to the interior of buildings	2,5
Means of alarm	Voice communication systems	2,4
Extinguishing media	Extinguishing systems (clean gases, water mist, etc.)	2,4
Facilities for Firefighters	Approach conditions for pump cars	2,4
External propagation	Boundary walls, fire resistance vs. spacing	2,3
Facilities for Firefighters	Location and number of access roads for firefighters	2,3
External propagation	Combustibility of roof coverings	2,2
Means of alarm	Communication systems for firefighters	2,1
Means of evacuation	Smoke control or smoke management systems	2,1
Facilities for Firefighters	Fire command center	2,1
Indoor propagation	Treatment of atria	2,0
Indoor propagation	Fire behavior (reaction to fire)	1,8
External propagation	Requirements for facades	1,7
Indoor propagation	Use of plastics	1,4
Indoor propagation	Limitations for content and furniture	1,3



## 4.3. Conclusions of the second questionnaire

The main conclusions derived from the second questionnaire state that:

**i.** The best evaluated aspects, with values between 4.0 and 5.0, correspond to portable fire extinguishers and signage, the most basic minimum measures that do not require significant cost or development.

**ii.** When considering the items and aspects evaluated with a value between 3.0 and 3.9, it is observed that, in this rank, associated with a minimum acceptable compliance, but with room for improvement, are the three base items, corresponding to definitions, classification of occupations and types of construction.

**iii.** The means of alarm corresponding to positive annunciation devices and manual or automatic detection systems are in the range of values 3.0 to 3.9, as are the items associated with evacuation, such as: the minimum number of exits, travel distances, location of exterior safe zones, lighting, occupant load values, capacity factors and conditions for unloading exits.

**iv.** It can be seen that most of the extinction means and their components, such as: fire water tanks, pumps for fire water networks, hose stations, fire department connections, private hydrants and automatic sprinklers, are in this intermediate range.

**v.** In this same range are the fire resistance of main structural elements of the item structural stability in fire, and the compartmentalization aspects in fire sectors, transfer of installations and treatment of openings of the item interior propagation.

**vi.** When considering the items and aspects evaluated with a value between 2.0 and 2.9, which represents a low level of development, it can be seen that some of these have a great impact on the life safety of the occupants of a building in case of fire, such as the definition of the types of evacuation, the alternative location of exits, the level of protection of these and accessibility requirements.

**vii.** This range also includes complementary measures for life safety, such as voice communication systems, smoke control or management systems and interaction with automatic sprinkler systems.

In the range between values 2.0 and 2.9, there are also some means of extinction, such as public hydrants, which are used to recognize problems, and special extinguishing systems, such as clean gases and water mist.

**ix.** The four aspects defined as facilities for firefighters, which correspond to access conditions to the interior of buildings, approach conditions for fire trucks, location and quality of access roads for firefighters and fire command center, together with communication systems for firefighters, in the item means of communication for firefighters, have assigned values between 2.0 and 2.9.

**x.** The other items with a rating between 2.0 and 2.9 are those related to structural stability in incendios, which are: fire resistance of the structure and of secondary structural elements, as well as the interaction with sprinkler systems; and also, those grouped in the items of interior propagation, such as, compartmentalization of special risk enclosures, protection of vertical openings, and protection of the interior of the building, as well as the interaction with sprinkler systems. Interior propagation items, corresponding to boundary walls, fire resistance vs. spacing and combustibility of roof openings, and those grouped in the items of interior propagation, such as compartmentation of special risk enclosures, protection of vertical openings and treatment of atriums; and those of exterior propagation, corresponding to boundary walls, fire resistance vs. spacing and combustibility of roof openings.

**xi.** With values assigned below 2.0, the aspects of fire behavior (reaction to fire), requirements for facades, use of plastics, limitations for contents and furniture are found in, indicating that these are concepts and requirements that are rarely found in the region.

**xii.** Finally, the assessment of the importance of each aspect evaluated established that the vast majority of these aspects were rated as 2 (important) or 3 (critical importance), which consolidates an integrated vision of fire protection.

## 5. CONCLUSIONS AND FUTURE ACTIVITIES

The main conclusions from the analysis of the responses to the questionnaires on fire protection regulation are:

**h)** All member countries of the Red Latinoamericana de Protección Contra incendio - Latam PCI have a code or regulations contained in other documents that frame requirements on fire protection for buildings and installations.

**i)** The development of these requirements is based on several sources, and there is no coincidence among them, with the exception of most of the regulations of Costa Rica, Ecuador and Panama, which have adopted the NFPA 101 code. The rest of the Latam PCI Network member countries have non-comparable regulations, many of which are based on NFPA code requirements, but which also incorporate some European concepts and requirements. These self-developed regulations include those of Brazil and Peru.

**j)** Despite their different sources, the regulations tend to use the NFPA design and implementation standards or other standards of their own, but to develop based on them. Only Argentina has some design and installation standards closer to Europe. It is not feasible to have a common fire code in the region in the medium or long term.

**k)** All regulations are prescriptive, and there is no trend or need to incorporate performance-based requirements.

**l)** In general, the problems of regulation are associated with the lack of scheduled processes for review and updating, open to all stakeholders. Only countries that have adopted the NFPA 101 code benefit from the results of the regular NFPA update process.

**m)** The participation of firefighters, whether in the development stage of codes or requirements, in their review and in the control of their application, is also different in the countries of the PCI Latam Network. It is estimated that the active participation of firefighters in these processes strongly contributes to their improvement.

Although it is recognized that some of the responses to the questionnaires may have been biased or incomplete in their results reflect the perception of specialists in one or more areas of fire protection, forming a reliable and primary approximation of the reality in the region.

It is important to reiterate that, based on the analysis of these results, both local results per country and global results for the region, it is possible to establish those aspects that are most deficient and of greater importance or impact on the levels of fire protection that need to be addressed. The first activity to be considered is a more in-depth and detailed analysis of the aspect evaluated, in order to ratify the perception obtained through the questionnaires.

Some of the aspects that should be considered in future actions correspond to those related to interior and exterior propagation, which, in global terms, are the ones with the lowest valuation.

## ANNEX 1. ANSWERS FIRST QUESTIONNAIRE

The following tables show the responses to the first questionnaire from organizations or associations in Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico and Paraguay.

**Table i.** Existence of a mandatory fire code

**Is there a mandatory code, with the force of law, that regulates the fire protection measures that must be complied with for new buildings?**

<b>Country</b>	<b>Reply</b>	<b>Comments</b>
Brazil	Yes	Brazil is a federation with 27 states, and each state has the responsibility to write its own fire code. However, more than 10 years ago, São Paulo's fire code became the model for most states, and today, 20 of the 27 states (representing more than 90% of Brazil's GDP) follow that state's legislation. That is why all the following discussion will be about the legislation of the state of São Paulo.
Chile	Yes	The main legal document is the Ordenanza General de Urbanismo y Construcciones. It is the national building code of mandatory compliance.
Colombia	Yes	
Costa Rica	Yes	
Ecuador	Yes	It is the NEC HS CI (Ecuadorian Construction Standard Fire Chapter).
Mexico	Yes	<p>In Mexico, fire protection measures are regulated in Normas Oficiales Mexicanas at the federal level and in Construction Regulations or Technical Norms Complementary to Construction Regulations and in municipal Civil Protection Regulations. Mexico is a republic made up of 32 free and sovereign states. Each state is further divided into free municipalities, for a total of 2469. Construction is regulated by the municipality. Therefore, there could be as many construction regulations as there are municipalities in Mexico. This does not happen and only a percentage of has some kind of regulation. In addition, the states have Civil Protection laws and regulations, and the municipalities have Civil Protection regulations, which indicate various safety measures for fire protection. There are some municipalities that, in addition to the above, have specific fire prevention and protection regulations. Therefore, we conclude that there are the following types of ordinances.</p> <p>a) Federal Level. Mexican Official Standards. The applicable standard for most establishments is NOM-002-STPS-2010.</p> <p>b) Construction regulations or the Complementary Technical Norms of the same. One per municipality. The most influential is Mexico City, from which this questionnaire is being answered.</p>
Paraguay	Yes	In the city of Asuncion, which is the capital of the Republic of Paraguay, at the local (Municipal level, is in force the Municipal Ordinance No. 468/2014, which is called "General Fire Prevention Regulations for Human Safety", which in its Art. 1st, establishes: The purpose of this Ordinance provide the minimum requirements necessary to establish Fire protection for human safety, to an adequate protection of life and property against risks created by fire, explosion, spills or of hazardous products.

**Table ii. Existence of a specific fire code**

**Is this Code specific to fire safety or are the requirements part of other major document(s) (such as building code, workplace safety code, earthquake resistant building code)? Name only the main, indicating their requirements and in which types of occupations they apply, as well as their Federal (applies nationwide), State, Provincial or Municipal nature.**

<b>Country</b>	<b>Comments</b>
Brazil	Specific for fire safety. Decree No.63911/2018 (mandatory)
Chile	Content in a building code: Ordenanza General de Urbanismo y Construction (mandatory)
Colombia	It is part of one or more other main documents. Indicate the documents and requirements: NSR 10 (mandatory) and Icontec standards.
Costa Rica	Specific to fire safety and is part of one or more other principal documents. Indicate the documents and requirements. Documents: - Costa Rican Building Regulations 2018 - Law of the Meritorious Fire Department of Costa Rica. Law No. 8228 - Regulations to Law No. 8228 of the Meritorious Fire Department of Costa Rica. - National Fire Protection Regulations, Costa Rican Fire Department, Engineering Unit, November 2020. (All required)
Ecuador	Specific for fire safety. Document: Ecuadorian Construction Standard (mandatory)

Mexico	<p>Specific for fire safety:  NOM-002-STPS-2010 and Regulation for the Prevention, Control of Fires and Firefighting for Civil Safety in the Municipality of Tijuana, Baja California (NOM-002-STPS-2010 y Reglamento para la Prevención, Control de los Incendios y Siniestros para Seguridad Civil en el Municipio de Tijuana, Baja California)</p> <p>It is part of one or more other main documents:  Reglamento de Construcciones para el Distrito Federal y Normas Técnicas Complementarias para el diseño y construcción de obras e instalaciones hidráulicas (Construction Regulations for the Federal District and Complementary Technical Standards for the design and construction of hydraulic works and facilities).</p> <p>Documents:  Mexican Official Standard NOM-002-STPS-2010 (Mandatory)  Reglamento de Construcciones para el Distrito Federal y Normas Técnicas Complementarias para el diseño y construcción de obras e instalaciones hidráulicas (Mandatory) Reglamento para la</p>
Paraguay	<p>Specific for fire safety. Documents:  Ordinance No. 468/2.014 (Mandatory)  Ord. No. 26.104/1.991 (Mandatory)</p>

**Table iii. Origin of the fire code**

**The requirements of the fire code (specific to fire safety) or the requirements of one or more other major documents can be classified as:**

<b>Country</b>	<b>Comments</b>
Brazil	It is an "adaptation" of an international code. The requirements have been developed in the country.
Chile	The requirements have been developed in the country. The requirements are self-developed, but are based on NFPA 13 and NFPA 72, among other internationally recognized standards. The development of passive protection took European test criteria under fire curve to ASTM E 119.
Colombia	It corresponds to an international code, with modifications. It is an "adaptation" of an international code.
Costa Rica	It corresponds to an international code adopted in its entirety. Exceptions apply to some NFPA codes and standards that do not apply to Costa Rica. See Article 67 Decree No. 37615.MP DECREE No. 37615-MP Regulations to Law No. 8228 of the Meritorious Fire Department of Costa Rica.
Ecuador	It corresponds to an international code, with modifications. The code is the adoption by reference of the NFPA 101 Human Safety Code, with the modification that high-rise buildings are those over 28 m (82 ft).
Mexico	The requirements have been developed in the country.
Paraguay	It is an "adaptation" of an international code. It was developed by an inter-institutional work team - Fire Brigades - Construction Trade Unions - Municipality of Asuncion - National Institute of Technology and Standardization - Paraguayan Chamber of Industrial Safety - NFPA support.

**Table iv. Responsible for fire code development****Which agency is responsible for developing the code or documents with requirements?**

<b>Country</b>	<b>Comments</b>
Brazil	São Paulo State Fire Department.
Chile	The Ministry of Housing and Urbanism, through its Urban Development division, is in charge of developing and updating the General Ordinance of Urbanism and Constructions.
Colombia	Ministry of Environment and Housing.
Costa Rica	Meritorious Fire Department of Costa Rica.
Ecuador	Ministry of Housing and Habitat.
Mexico	Secretary of Labor and Social Security. Commission appointed by the Mexico City administration and may be expanded with representatives of professional associations. Cabildo de Municipio.
Paraguay	Fire Department, Municipality, Trade Unions, Paraguayan Chamber of Industrial Securitytrial.

**Table v. Responsible for the approval of the fire code****Which agency is responsible for approving the code or requirements?**

<b>Country</b>	<b>Comments</b>
Brazil	Governor and Legislative Assembly of the State of São Paulo.
Chile	Office of the Comptroller General of the Republic (legal, not technical verification).
Colombia	Ministry of Environment and Housing.
Costa Rica	Legislative Branch.
Ecuador	Ministry of Housing and Habitat. The elaboration of the norms is in charge of the Ministry of Housing and Habitat and is carried out jointly with all interested agencies, including interested individuals; after completion, it undergoes a disclosure process in which comments may be issued, after which it is issued through a ministerial resolutionterial and published in the official registry.
Mexico	CONAMER National Council for Regulatory Improvement. Commission. Cabildo of the Municipality.
Paraguay	National Institute of Technology and Standardization, Municipality.

**Table vi. Responsible for the approval of the fire code**

**Is there a defined schedule for the revision of the code or requirements of other major documents ? If so, what is the frequency?**

<b>Country</b>	<b>Reply</b>	<b>Comments</b>
Brazil	No	Revisions are performed on average every 10 years, but there is no set deadline.
Chile	No	There is no pre-established timetable.
Colombia	Yes	It is reviewed more or less every 3 or 4 years.
Costa Rica	Yes	By adopting the complete NFPA package, it is updated according to the NFPA calendario.
Ecuador	No	
Mexico	No	NOM-002-STPS: every 5 years. Construction Regulation and NTC: undefined. Fire prevention regulations: indefinite.
Paraguay	No	

**Table vii. Existence of reviews open to the public of the fire code.**

**Is the review process for the code or other major documents that have fire protection requirements open to the general public or professional bodies?**

<b>Country</b>	<b>Reply</b>	<b>Comments</b>
Brazil	No	The process is not necessarily open to the public or to professional entities. It may be, but it depends on the willingness of the fire fighter commanderberos at the time of the review.
Chile	Yes	When the Ministry of Housing and Urban Development generates a modification, it is submitted for public consultation to receive comments and observations from individuals and organizations. From these, the Ministry develops the final version, without necessarily involving further participation in this last stage.
Colombia	Yes	It is open to professional entities and interdisciplinary groups.
Costa Rica	Yes	When a document is published, a public consultation is carried out. Subsequent to the review of the observations and approval or repeal of the same, is published in the Official Gazette so that their mandatory use becomes final.
Ecuador	Yes	Open to the public.

Mexico	YES	The STPS (Secretaría del Trabajo y Previsión Social) Occupational Safety Directorate prepares a Preliminary Draft Standard. It sends it to the National Advisory Committee for Occupational Safety and Health Standardization, which creates a working group to review the preliminary draft. Once the preliminary draft has been reviewed and, if necessary, modified, the working group sends it back to the Committee as a draft standard, which is then sent to CONA-MER (National Council for Regulatory Improvement), which approves it, and then it is published in the Official Gazette of the Federation and published as a Draft Standard, at which time interested parties may make comments within 60 calendar days. If applicable, comments are received and forwarded to the working group for consideration. Once all comments have been answered and accepted modifications have been made, it is sent to the Committee for approval as an Official Mexican Standard.
Paraguay	No	Not if there is no political or trade union will.

**Table viii. Type of fire code requirements**

**Are the requirements of the code or key documents prescriptive or performance-based?**

<b>Country</b>	<b>Comments</b>
Brazil	Prescriptive.
Chile	Prescriptive, but performance-based solutions are allowed. For rehabilitation of real estate, where it is not possible to comply with the current regulations. Also in evacuation studies for occupancies over 1000 people is allowed.
Colombia	Prescriptive, but performance-based solutions are allowed.
Costa Rica	Prescriptive, but performance-based solutions are allowed. Comments: NFPA allows its prescriptive use and when the code or standard does not provide criteria, design for performance is used.
Ecuador	Prescriptive, but performance-based solutions are allowed, as stated in the NFPA 101 Human Safety Code.
Mexico	Prescriptive.
Paraguay	Prescriptive. It is still difficult in Paraguay to adopt or apply a performance-based code, considering that the current regulation (Ordinance) dates back to 2014, which had a two-year adaptation period, after which it became mandatory.



**Table ix. Variables affecting the type of protection required**

**Indicate the variables that affect the type of protection required for a new building.**

Country	Comments
Brazil	<ul style="list-style-type: none"> <li>- Building height/Number of stories.</li> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> </ul>
Chile	<ul style="list-style-type: none"> <li>- Building height/Number of stories.</li> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Type of construction.</li> </ul> <p>Note: The number of occupants is also a variable that impacts the requirements. The fire resistance requirements for some industrial and storage applications are a function of the fire load.</p>
Colombia	<ul style="list-style-type: none"> <li>- Building height/Number of stories.</li> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Type of construction.</li> </ul>
Costa Rica	<ul style="list-style-type: none"> <li>- Building height/Number of stories.</li> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Type of construction.</li> </ul>
Ecuador	<ul style="list-style-type: none"> <li>- Building height/Number of stories.</li> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Type of construction.</li> </ul>
Mexico	<p>a) NOM-002-STPS-2010:</p> <ul style="list-style-type: none"> <li>- Building surface.</li> <li>- Building height/Number of stories.</li> </ul> <p>Others: An operation is carried out that considers the quantities of solids, liquids and flammable and combustible gases.</p> <p>b) Construction Regulations and NTC:</p> <ul style="list-style-type: none"> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Building height/Number of stories.</li> </ul> <p>c) Fire prevention regulations:</p> <ul style="list-style-type: none"> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> </ul>
Paraguay	<ul style="list-style-type: none"> <li>- Building height/Number of stories.</li> <li>- Building surface.</li> <li>- Occupancy type (use or destination).</li> <li>- Type of construction.</li> </ul>

**Table x. Fire code enforcement agency**

**Which agency or entity is the Authority Having Jurisdiction or Jurisdiction to enforce compliance with fire code or other requirements documents with requirements?**

<b>Country</b>	<b>Comments</b>
Brazil	Firefighters.
Chile	The Directorates of Works of the Municipalities.
Colombia	Curadurías, Fire Department.
Costa Rica	Meritorious Fire Department of Costa Rica.
Ecuador	Fire Departments of each city.
Mexico	a) NOM-002-STPS-2010: There is an office of the Secretaría del Trabajo in each of the states and the inspection area of the Secretaría del Trabajo is responsible for overseeing compliance with NOM-002-STPS. b) Public Administration of the CDMX and cooperates with the Secretariat of Integrated Risk Management and Civil Protection. c) Fire prevention regulations: Fire Department.
Paraguay	Municipality.

**Table xi. Exceptions or non-compliance with the fire code**

**Does the Competent Authority have the power to allow exceptions or non-compliance with the fire code or requirements of other principal documents?**

<b>Country</b>	<b>Reply</b>	<b>Comments</b>
Brazil	Yes	Non-compliances no, exceptions yes. Exceptions apply to new technologies or to the use of different technical standards (FM Global, for example) when they differ from officially adopted standards. In such cases, it is necessary to enter a formal analysis process by a Fire Department.
Chile	No	
Colombia	No	
Costa Rica	Yes	
Ecuador	No	
Mexico	No	
Paraguay	No	

**Table xii. Fire code concepts**

**Does your country's Fire Code or core document requirements use any of the following concepts?**

Country	Comments
Brazil	<ul style="list-style-type: none"> <li>- Defines the maximum area of buildings that can be constructed without sprinklers.</li> <li>- Defines the maximum height of buildings that can be constructed without sprinklers.</li> <li>- It uses the "fire load" (MJ/m<sup>2</sup>) to characterize the risk of an occupation.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for sealing penetrations.</li> <li>- Defines requirements for the protection of vertical openings.</li> <li>- Defines requirements for fire protection of building structures.</li> <li>- Defines requirements to limit the use of combustible plastics and coatings.</li> <li>- Allows the use of sprinklers to reduce the requirements of other protection measures.</li> </ul>
Chile	<ul style="list-style-type: none"> <li>- Uses the "fire load" (MJ/m<sup>2</sup>) to characterize the risk of an occupation.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for sealing penetrations.</li> <li>- Defines requirements for fire protection of building structures. - Allows the use of sprinklers to reduce the requirements of other protection measures. Note: The sprinkler requirement is only for hospitals, prisons, nursing homes and similar facilities with a capacity of more than 50 people, as well as shopping centers with an occupancy of more than 1,000 people. There are no limitations on the floor area or height of buildings without sprinklers.</li> </ul>
Colombia	<ul style="list-style-type: none"> <li>- Defines the maximum area of buildings that can be constructed without sprinklers.</li> <li>- Defines the maximum height of buildings that can be constructed without sprinklers.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for sealing penetrations.</li> <li>- Defines requirements for the protection of vertical openings.</li> <li>- Defines requirements for fire protection of building structures.</li> <li>- Defines requirements to limit the use of combustible plastics and coatings.</li> </ul>
Costa Rica	<ul style="list-style-type: none"> <li>- Defines the maximum area of buildings that can be constructed without sprinklers.</li> <li>- Defines the maximum height of buildings that can be constructed without sprinklers.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for sealing penetrations.</li> <li>- Defines requirements for the protection of vertical openings.</li> </ul>
Ecuador	<ul style="list-style-type: none"> <li>- Defines the maximum area of buildings that can be constructed without sprinklers.</li> <li>- Defines the maximum height of buildings that can be constructed without sprinklers.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for sealing penetrations.</li> <li>- Defines requirements for the protection of vertical openings.</li> <li>- Defines requirements for fire protection of building structures.</li> <li>- Defines requirements to limit the use of combustible plastics and coatings.</li> <li>- Allows the use of sprinklers to reduce the requirements of other protection measures.</li> </ul>

Mexico	<ul style="list-style-type: none"> <li>- It uses the "fire load" (MJ/m<sup>2</sup>) to characterize the risk of an occupation.</li> <li>- Defines horizontal and vertical interior compartmentalization requirements.</li> <li>- Defines requirements for fire protection of building structures.</li> </ul>
Paraguay	<ul style="list-style-type: none"> <li>- Defines the maximum height of buildings that can be constructed without sprinklers.</li> <li>- Defines requirements for fire protection of building structures.</li> <li>- Defines requirements to limit the use of combustible plastics and coatings.</li> </ul>

**Table xiii. Automatic sprinkler requirements of fire code**

**Thinking specifically about the use of sprinklers, the Fire Code or the requirements of other documents in your country require protection for the following new buildings:**

Country	Comments
Brazil	<ul style="list-style-type: none"> <li>- High-rise buildings (over 23 m high).</li> <li>- Hospitals - Shopping malls.</li> <li>- Commercial buildings.</li> <li>- Supermarkets.</li> <li>- Public meeting buildings.</li> <li>- Hotels.</li> <li>- Warehouses or warehouses.</li> </ul> <p>Note: For buildings up to 23 or 30 m, depending on occupancy, the São Paulo decree uses horizontal and vertical compartmentalization as basic protection criteria, and establishes minimum areas that can be protected without sprinklers. If the minimum areas are not met, then the use of sprinklers is mandatory. Above 23 or 30 m, depending on occupancy, sprinklers are mandatory. For example, tanks up to 4000 m<sup>2</sup> do not require sprinklers. Those larger than 4000 m<sup>2</sup> should be compartmentalized into 4000 m<sup>2</sup> blocks without sprinklers or can be protected with sprinklers without compartmentalization.</p>
Chile	<ul style="list-style-type: none"> <li>- Hospitals.</li> <li>- Shopping malls.</li> <li>- Prisons or other places of confinement.</li> </ul>
Colombia	<ul style="list-style-type: none"> <li>- High-rise buildings (over 23 m high).</li> <li>- Hospitals.</li> <li>- Shopping malls.</li> <li>- Commercial buildings.</li> <li>- Supermarkets.</li> <li>- Public meeting buildings.</li> <li>- Prisons or other places of confinement.</li> <li>- Hotels.</li> <li>- Industries.</li> <li>- Warehouses or warehouses.</li> </ul> <p>Note: Housing only requests in basements and common areas.</p>

Costa Rica	<ul style="list-style-type: none"> <li>- High-rise buildings (over 23 m high).</li> <li>- Hospitals.</li> <li>- Shopping malls.</li> <li>- Commercial buildings.</li> <li>- Supermarkets.</li> <li>- Public meeting buildings.</li> <li>- Prisons or other places of confinement.</li> <li>- Hotels.</li> <li>- Residential buildings.</li> <li>- Industries.</li> <li>- Warehouses or warehouses.</li> </ul> <p>Note: It must comply with the provisions of NFPA according to Decree No. 37615-MPDE- CRETO No. 37615-MP Regulation to Law No. 8228 of the Meritorious Fire Department of Costa Rica.</p>
Ecuador	<ul style="list-style-type: none"> <li>- High-rise buildings (over 23 m high).</li> <li>- Hospitals - Shopping malls.</li> <li>- Commercial buildings.</li> <li>- Supermarkets.</li> <li>- Public meeting buildings.</li> <li>- Prisons or other places of confinement.</li> <li>- Hotels.</li> <li>- Residential buildings.</li> </ul> <p>Note: As required by the Human Security Code. Sprinkler requirements in industries or warehouses is a common requirement of insurers. NECHS- CI requests that when asset protection is required, it must be done using NFPA 1 Fire Code.</p>
Mexico	None of the above documents require the use of sprinklers.
Paraguay	<ul style="list-style-type: none"> <li>- High-rise buildings (over 23 m high).</li> <li>- Hospitals.</li> <li>- Shopping malls.</li> <li>- Commercial buildings.</li> <li>- Supermarkets.</li> <li>Public meeting buildings.</li> <li>- Prisons or other places of confinement.</li> <li>- Hotels.</li> <li>- Residential buildings.</li> </ul>

## ANNEX 2. ANSWERS, SECOND QUESTIONNAIRE

The following tables show the responses to the second questionnaire from organizations or associations in Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Panama, Paraguay and Peru. In those cases in which no answer was given to a question in the questionnaire, it is included in the S/R (no answer) tables and a value of zero is assigned for its evaluation.

**Table a. Base items**

Country	Definitions		Classification of occupations		Types of construction	
	Incorporated	Value	Incorporated	Value	Incorporated	Value
Argentina	Yes	3	Yes	3	Yes	3
Brazil	Yes	3	Yes	3	No	3 <sup>(1)</sup>
Chile	Yes	3	Yes	2	Yes	2
Colombia	Yes	5	Yes	5	Yes	5
Costa Rica	Yes	4	Yes	5	Yes	5
Ecuador	Yes	5	Yes	5	Yes	5
Mexico	Yes	3	Yes	3	No	0
Panama	Yes	5	Yes	5	Yes	5
Paraguay	Yes	3	Yes	2	Yes	2
Peru	Yes	3	Yes	3	Yes	5
Rep. Dominican	Yes	3	Yes	3	Yes	3

Note (1): Brazil has not defined closed construction types, but there are requirements. It follows the European model that defines the fire resistance of the structural elements according to the height of the building, but does not prohibit any type of construction method.

**Table b. Alarm and evacuation means**

Country	Manual or automatic detection systems			Annunciation devices			Voice communication systems		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	1	Yes	Yes	3	No	Yes	0
Brazil	Yes	Yes	5	Yes	Yes	5	No	No	0
Chile	Yes	No	2	Yes	No	2	Yes	No	2
Colombia	Yes	Yes	3	Yes	Yes	3	No	S/R	0
Costa Rica	Yes	Yes	4	Yes	Yes	4	Yes	Yes	3
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	No	2	Yes	No	2	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	Yes	3	Yes	No	3	No	No	3
Peru	Yes	Yes	5	Yes	Yes	5	Yes	Yes	4
Dominican Republic	Yes	Yes	4	Yes	Yes	4	Yes	Yes	4

**Table c. Alarm and evacuation means**

Country	Communication systems for firefighters		
	Requirement	Standards	Value
Argentina	No	No	0
Brazil	No	No	0
Chile	Yes	No	2
Colombia	No	S/R	0
Costa Rica	Yes	Yes	2
Ecuador	Yes	Yes	5
Mexico	No	No	0
Panama	Yes	Yes	5
Paraguay	Yes	No	1
Peru	Yes	Yes	4
Dominican Republic	Yes	Yes	4

**Table d. Alarm and evacuation means**

Country	Type of evacuation			Occupant load values			Capacity factors		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	No	Yes	0	No	No	0	No	No	0
Brazil	Yes	Yes	4	Yes	Yes	5	Yes	Yes	5
Chile	No	No	3	Yes	Yes	3	Yes	Yes	3
Colombia	No	S/R	0	Yes	Yes	3	Yes	Yes	3
Costa Rica	Yes	Yes	2	Yes	Yes	4	Yes	Yes	4
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	No	No	0	No	No	0	Yes	No	0
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0	No	No	0
Peru	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Rep. Dominican	Yes	Yes	4	Yes	Yes	3	Yes	Yes	3

**Table e. Alarm and evacuation means**

Country	Type of evacuation			Occupant load values			Capacity factors		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	2	Yes	Yes	2	YES	No	2
Brazil	Yes	Yes	3	Yes	Yes	5	Yes <sup>(1)</sup>	Yes	1
Chile	Yes	Yes	3	Yes	Yes	3	Yes	Yes	3
Colombia	Yes	Yes	3	Yes	Yes	3	Yes	Yes	2
Costa Rica	Yes	Yes	5	Yes	Yes	5	Yes	Yes	4
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	Yes	2	Yes	No	2	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	3	No	No	0	No	No	0
Peru	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Rep. Dominican	Yes	Yes	2	Yes	Yes	2	No	No	1

Note (1): Brazil expresses as a critical problem the requirement of a single emergency staircase in high-rise buildings.



**Table f. Alarm and evacuation means**

Country	Output protection level			Conditions for downloading outputs		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	No	No	0	No	No	0
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	3	Yes	Yes	3
Colombia	Yes	Yes	2	Yes	Yes	2
Costa Rica	Yes	Yes	5	Yes	Yes	4
Ecuador	Yes	Yes	5	Yes	Yes	5
Mexico	No	No	0	Yes	Yes	3
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0
Peru	Yes	Yes	5	Yes	Yes	5
Dominican Republic	Yes	Yes	1	No	No	1

**Table g. Alarm and evacuation means**

Country	Signage			Lighting		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	3	Yes	Yes	4
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	4	Yes	Yes	4
Colombia	Yes	Yes	4	Yes	Yes	4
Costa Rica	Yes	Yes	5	Yes	Yes	5
Ecuador	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	Yes	4	Yes	No	3
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	3	Yes	No	2
Peru	Yes	Yes	5	Yes	Yes	5
Dominican Republic	Yes	Yes	3	Yes	Yes	3

**Table h. Alarm and evacuation means**

Country	Interaction with sprinkler systems			Smoke control or smoke management systems		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	No	Yes	0	Yes	Yes	1
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	3	Yes	No	1
Colombia	Yes	Yes	1	No	N/R	0
Costa Rica	Yes	Yes	4	Yes	Yes	2
Ecuador	Yes	Yes	5	Yes	Yes	5
Mexico	No	No	0	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	2	No	No	0
Peru	Yes	Yes	5	Yes	Yes	3
Dominican Republic	Yes	Yes	1	Yes	Yes	1

**Table i. Alarm and evacuation means**

Country	Accessibility requirements			Location of secure outdoor areas		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	2	No	No	0
Brazil	Yes	Yes	2	Yes	Yes	1
Chile	No	No	0	No	No	0
Colombia	Yes	Yes	4	Yes	Yes	4
Costa Rica	Yes	Yes	4	Yes	Yes	3
Ecuador	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	No	2	Yes	No	3
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0
Peru	Yes	Yes	5	Yes	Yes	5
Dominican Republic	No	No	1	No	No	1

**Table j. Structural stability in fires**

Country	Fire resistance of the structure			Main structural elements		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	2	Yes	Yes	2
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	5	Yes	Yes	5
Colombia	Yes	Yes	2	Yes	Yes	2
Costa Rica	Yes	Yes	5	Yes	Yes	5
Ecuador	Yes	No	0	Yes	Yes	5
Mexico	No	No	0	Yes	Yes	1
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	3	No	No	0
Peru	Yes	Yes	3	No	Yes	3
Dominican Republic	Yes	Yes	1	Yes	Yes	2

**Table k. Structural stability in fires**

Country	Secondary structural elements			Interaction with sprinkler systems		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	1	Yes	No	2
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	4	Yes	Yes	1
Colombia	Yes	Yes	2	No	S/R	S/R
Costa Rica	Yes	Yes	5	Yes	Yes	4
Ecuador	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	No	0	No	Yes	0
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0
Peru	No	Yes	3	No	Yes	4
Dominican Republic	No	No	1	No	No	2

**Table I. Indoor propagation**

<b>Country</b>	<b>Compartmentation in fire sectors</b>			<b>Compartmentalization of special risk enclosures</b>			<b>Transfer of installations and treatment of openings</b>		
	<b>Requirement</b>	<b>Standards</b>	<b>Value</b>	<b>Requirement</b>	<b>Standards</b>	<b>Value</b>	<b>Requirement</b>	<b>Standards</b>	<b>Value</b>
Argentina	Yes	No	0	Yes	Yes	1	Yes	YES	3
Brazil	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	2	Yes	Yes	1	Yes	Yes	3
Colombia	Yes	Yes	3	No	S/R	S/R	Yes	Yes	3
Costa Rica	Yes	Yes	5	Yes	Yes	4	Yes	Yes	5
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	No	No	0	Yes	No	1	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	2	No	No	0	No	No	0
Peru	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Rep. Dominican	No	No	1	Yes	Yes	2	No	No	1

**Table m. Indoor propagation**

<b>Country</b>	<b>Protection of vertical openings</b>			<b>Treatment of atria</b>		
	<b>Requirement</b>	<b>Standards</b>	<b>Value</b>	<b>Requirement</b>	<b>Standards</b>	<b>Value</b>
Argentina	Yes	No	0	Yes	Yes	1
Brazil	Yes	Yes	5	Yes	Yes	2
Chile	No	No	0	No	No	0
Colombia	Yes	Yes	3	No	S/R	S/R
Costa Rica	Yes	Yes	5	Yes	Yes	4
Ecuador	Yes	Yes	5	Yes	Yes	5
Mexico	No	No	0	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0
Peru	Yes	Yes	4	No	Yes	3
Dominican Republic	No	No	1	Yes	Yes	2

**Table n. Indoor propagation**

Country	Fire behavior (Reaction to fire)			Use of plastics			Limitations for content and furniture		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	1	No	No	0	Yes	Yes	1
Brazil	Yes	Yes	5	Yes	Yes	5	Yes	Yes	0
Chile	No	No	0	No	No	0	No	No	0
Colombia	Yes	Yes	3	No	S/R	S/R	No	S/R	S/R
Costa Rica	Yes	Yes	5	Yes	Yes	2	Yes	Yes	2
Ecuador	Yes	No	0	Yes	No	0	Yes	No	0
Mexico	Yes	No	0	No	No	0	Yes	No	0
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0	Yes	No	2
Peru	No	No	0	No	No	0	No	No	3
Rep. Dominican	No	No	1	Yes	Yes	3	No	No	1

Note (1): The fire load of contents and furniture is given by average values of kJ/m<sup>2</sup>, depending on the type of occupancy. However, there is control over the reaction-to-fire characteristics of the finishing materials.

**Table ñ. Indoor propagation**

Country	Interaction with sprinkler systems		
	Requirement	Standards	Value
Argentina	Yes	Yes	2
Brazil	Yes	Yes	5
Chile	No	No	0
Colombia	Yes	Yes	4
Costa Rica	Yes	Yes	4
Ecuador	Yes	Yes	5
Mexico	No	Yes	0
Panama	Yes	Yes	5
Paraguay	No	No	0
Peru	Yes	Yes	3
Dominican Republic	Yes	Yes	3

**Table o. External propagation**

Country	Boundary walls, fire resistance vs. spacing			Combustibility of roof coverings			Requirements for facades		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	3	No	No	0	Yes	Yes	3
Brazil	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	3	No	No	0	Yes	No	1
Colombia	Yes	Yes	3	Yes	Yes	3	No	S/R	S/R
Costa Rica	No	No	0	Yes	Yes	3	No	No	0
Ecuador	No	No	0	No	No	0	No	No	0
Mexico	No	No	0	No	No	0	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0	No	No	0
Peru	Yes	Yes	5	No	Yes	5	No	Yes	5
Rep. Dominican	Yes	Yes	1	No	Yes	3	No	No	0

**Table p. Extinguishing media**

Country	Portable fire extinguishers			Hose stations			Connections for firefighters		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	4	Yes	Yes	3	Yes	Yes	3
Brazil	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	4	Yes	Yes	1	Yes	Yes	3
Colombia	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Costa Rica	Yes	Yes	4	Yes	Yes	2	Yes	Yes	3
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	Yes	4	Yes	No	3	Yes	Yes	4
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	Yes	3	Yes	No	2	No	No	0
Peru	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Rep. Dominican	Yes	Yes	5	Yes	Yes	4	Yes	Yes	3

**Table q. Extinguishing media**

Country	Private hydrants			Public hydrants			Automatic sprinklers		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	4	No	No	0	Yes	Yes	3
Brazil	Yes	Yes	5	Yes <sup>(1)</sup>	Yes	1	Yes	Yes	5
Chile	No	No	0	Yes	Yes	3	Yes	Yes	3
Colombia	Yes	Yes	5	Yes	Yes	5	Yes	Yes	4
Costa Rica	Yes	Yes	3	Yes	Yes	3	Yes	Yes	3
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	No	No	1	Yes	No	3	No	Yes	2
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	3	No	No	0	Yes	No	3
Peru	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Rep. Dominican	Yes	Yes	1	Yes	Yes	1	Yes	Yes	2

Note (1): Brazil points out that public hydrants are not the responsibility of the Fire Department, but of the City Hall, which means that coverage in the vast majority of Brazilian cities is insufficient. In addition, when there are public hydrants there are often flow and pressure problems. In summary, , fire protection systems in Brazil rely primarily on private networks.

**Table r. Extinguishing media**

Country	Pumps for fire water networks			Fire water tanks			Extinguishing systems (clean gases, water mist, etc.)		
	Requirement	Standards	Value	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	3	Yes	Yes	3	No	Yes	2
Brazil	Yes	Yes	5	Yes	Yes	5	Yes <sup>(1)</sup>	Yes	3
Chile	No	No	0	No	No	0	No	No	0
Colombia	Yes	Yes	4	Yes	Yes	4	No	S/R	S/R
Costa Rica	Yes	Yes	3	Yes	Yes	3	Yes	Yes	2
Ecuador	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Mexico	Yes	No	3	Yes	No	2	Yes	No	1
Panama	Yes	Yes	5	Yes	Yes	5	Yes	Yes	5
Paraguay	Yes	No	2	No	No	0	Yes	No	2
Peru	Yes	Yes	5	Yes	Yes	5	No	Yes	5
Rep. Dominican	Yes	Yes	2	Yes	Yes	2	Yes	Yes	1

Note (1): Of all the protection systems mentioned, clean gas and water mist systems are the only ones that do not have a local installation standard.

**Table s. Facilities for Firefighters**

Country	Location and number of access roads for firefighters			Approach conditions for pump cars		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	No	No	0	No	No	0
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	No	No	0	Yes	Yes	2
Colombia	S/R	S/R	S/R	S/R	S/R	S/R
Costa Rica	Yes	Yes	4	Yes	Yes	4
Ecuador	Yes	Yes	4	Yes	Yes	4
Mexico	No	No	0	No	No	0
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0
Peru	Yes	Yes	5	No	Yes	4
Dominican Republic	Yes	No	2	Yes	No	2

**Table t. Facilities for Firefighters**

Country	Conditions of access to the interior of buildings			Fire command center		
	Requirement	Standards	Value	Requirement	Standards	Value
Argentina	Yes	Yes	2	No	No	0
Brazil	Yes	Yes	5	Yes	Yes	5
Chile	Yes	Yes	1	No	No	0
Colombia	Yes	Yes	1	No	S/R	S/R
Costa Rica	Yes	Yes	4	Yes	Yes	2
Ecuador	Yes	Yes	4	Yes	Yes	4
Mexico	No	No	0	Yes	No	1
Panama	Yes	Yes	5	Yes	Yes	5
Paraguay	No	No	0	No	No	0
Peru	Yes	Yes	5	No	Yes	5
Dominican Republic	Yes	Yes	1	Yes	Yes	1



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