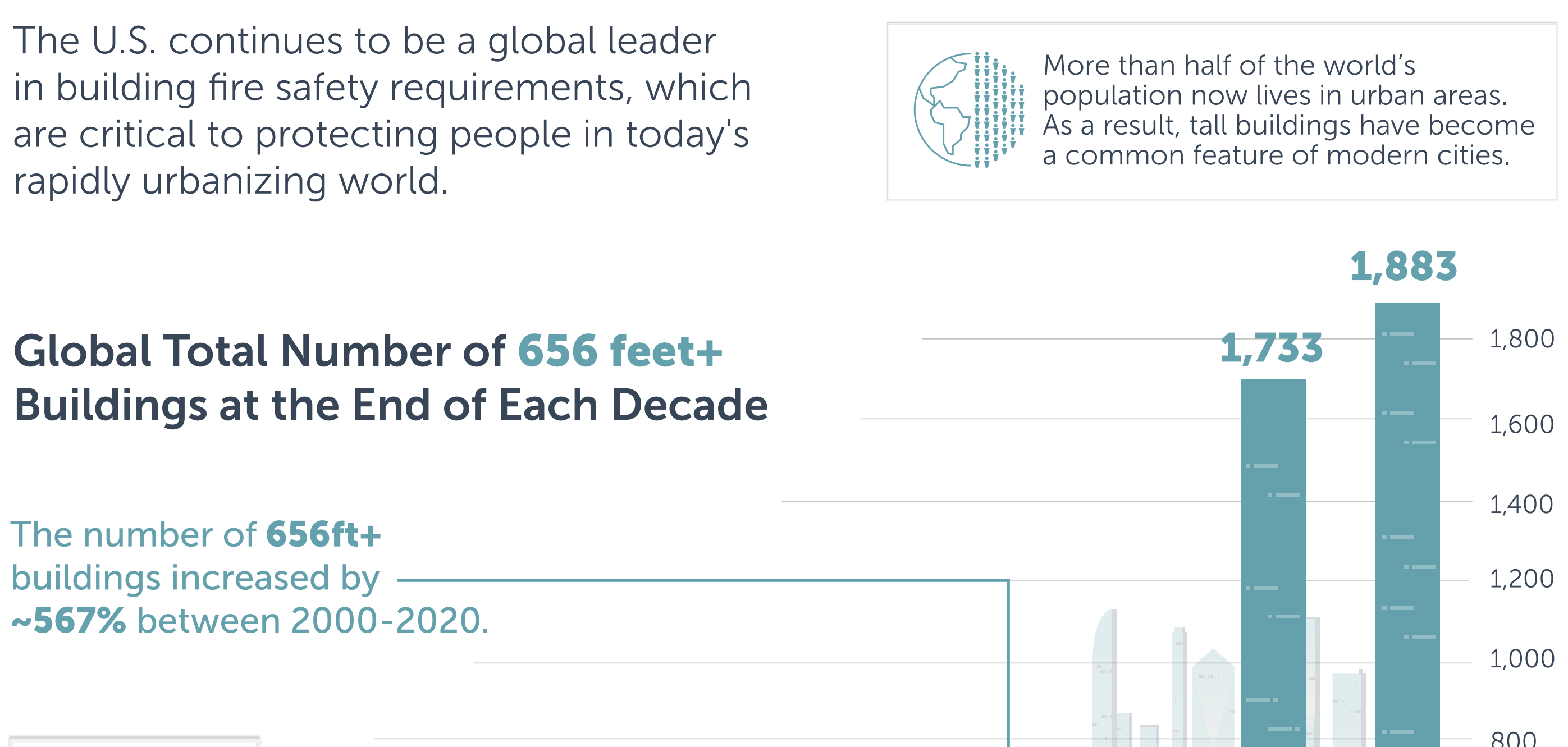
NAMBA
NORTH AMERICAN
MODERN BUILDING ALLIANCE

Visualizing the Importance of FIRE SAFETY IN HIGH-RISE BUILDINGS

The U.S. continues to be a global leader in building fire safety requirements, which are critical to protecting people in today's rapidly urbanizing world.

More than half of the world's population now lives in urban areas. As a result, tall buildings have become a common feature of modern cities.

Global Total Number of 656 feet+ Buildings at the End of Each Decade



The number of **656ft+** buildings increased by **~567%** between 2000-2020.

Source: Council on Tall Buildings and Urban Habitat

The increase in tall buildings combined with rising awareness around climate change has led to innovative and energy-efficient facade designs.

The facade is the exterior face or covering of a building.

Facade assemblies are critical in defining these building features:

- Aesthetic appeal
- Energy-efficiency
- Weather resistance
- Fire safety

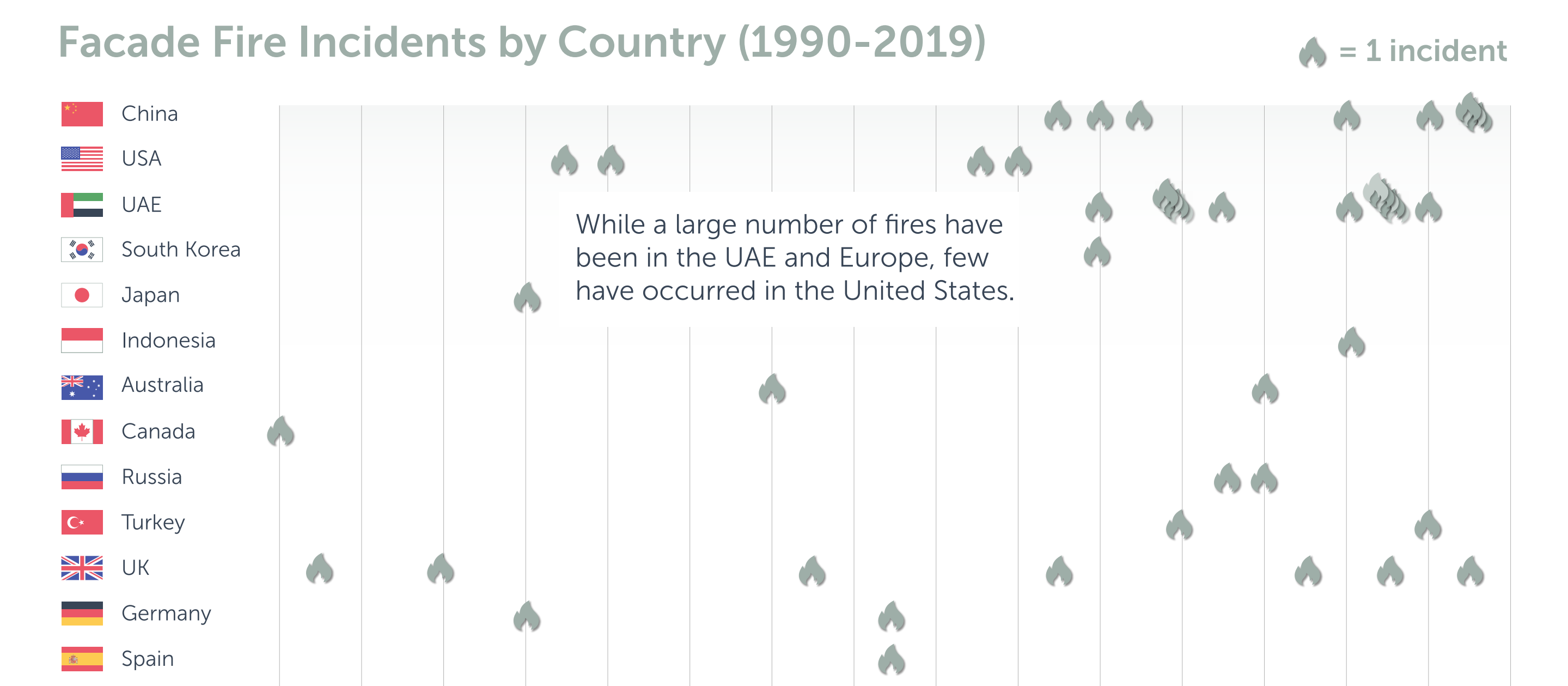
With improvements in safety engineering, fire incidents on a per-capita basis continue to decrease. However, with more buildings filling the sky, the total number of high-rise facade fires has increased.

Globally, incidents are more common in areas where fire safety regulations are outdated and/or less robust.

The Global Distribution of HIGH-RISE FACADE FIRES

The distribution of high-rise facade fires can show where fire safety regulations have been successful.

Facade Fire Incidents by Country (1990-2019)



Arranged in descending order by # of 656ft+ buildings
*# of 656ft+ buildings unknown
Source: M. Bonner, G. Rein, et. al (2019)

The Importance of BUILDING FIRE SAFETY

In densely populated urban areas, fire safety is paramount to the safety of occupants of tall buildings.

Higher number of occupants can lead to slower evacuation

Fires can spread faster vertically and in small spaces

Source: WFM Media

Adjusting building designs and policies for increased fire safety is becoming increasingly important, with a focus on:

Detection
Quickly alerting occupants and emergency services

Prevention
Using code-compliant construction materials to prevent and/or suppress fires

Extinguishment
Installation of sprinklers and smoke-management systems to extinguish fires

Containment
Installation of features that limit the spread of a fire from the point of origin

Evacuation
Availability of procedures, communication channels, and escape routes for occupants

Source: NAMBA

How are Fires Caused?

The top causes of fires include:

Smoking | Electrical malfunctions | Candles | Heating | Cooking

Source: NFPA

Facade fires can start in two ways:

- Start inside a room and break through the window to the exterior
- Start from the outside through external combustion and spread vertically

The facade system of a building plays a critical role in limiting the spread of a building fire. Non-compliant or unevaluated facade systems may pose risks for occupants.

How are FACADE SYSTEMS DESIGNED?

The building codes and fire safety regulations in a country often influence how facade systems are built.

Common features of building and fire code regulations include:

- Regulatory compliance
- Building maintenance
- Conformance to specified design
- Safety testing of facade assemblies
- Code enforcement
- Proper use of combustible materials

Even assemblies identified as noncombustible may fail if facades are improperly designed or assembled. Stringent testing provides added assurance that construction is safe, secure, and suitable for its intended use.

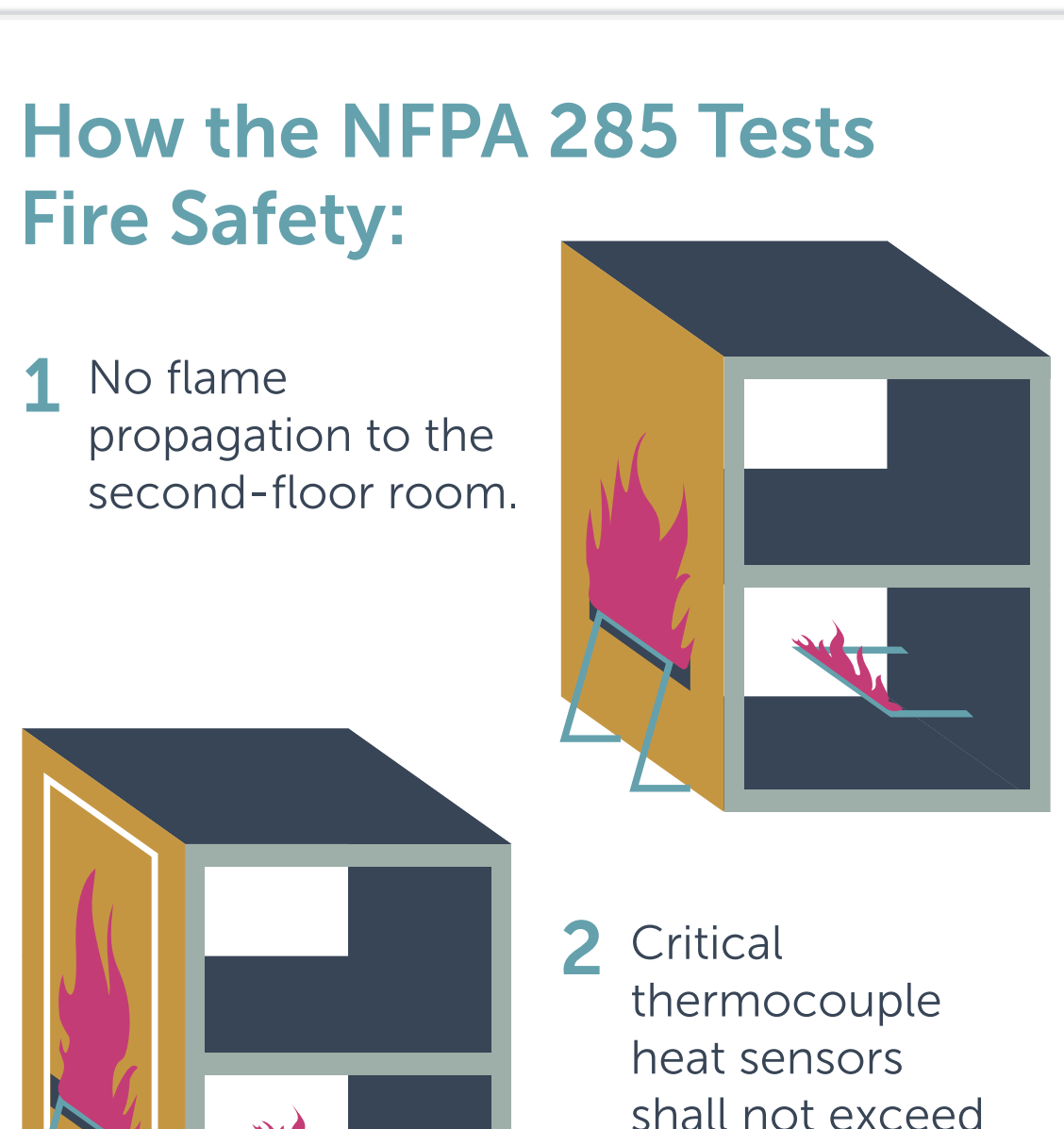
The United States: THE LEADER IN HIGH-RISE FACADE FIRE SAFETY

The U.S.' exceptional record in building fire safety is partly due to facade assembly testing that includes the NFPA 285 standard.

NFPA 285 is a standardized test for flame propagation on or within building exterior walls, developed by the National Fire Protection Association (NFPA).

As a flame propagation test for building exteriors since 1988, the application of NFPA 285 has evolved to include different types of materials.

How the NFPA 285 Tests Fire Safety:



1 No flame propagation to the second-floor room.

2 Critical thermocouple heat sensors shall not exceed 1,000° F during the 30 minute test.

3 Externally, flames shall not reach 10 feet above the window's top.

Externally, flames shall not reach 5 feet laterally from the window's centerline.

Timeline of the NFPA 285

1970s
Energy Crisis: Leads to increased exterior insulation applications
Late 70s: SPI develops full scale test

1980s
1988: Uniform Building Code adopts UBC 17-6 for full scale testing

1990s
1997: Uniform Building Code adopts UBC 26-9 for intermediate scale testing (2 stories)
1998: NFPA adopts UBC 26-9 as NFPA 285
The NFPA 285 was referred to as the UBC test prior to 1998.

2000s
2000: First edition of the International Building Code (IBC) retains the requirement for NFPA 285 testing
2009: IBC requires testing ACMs / HPLs / FRPs

2010s
2012: IBC expands NFPA 285 testing to WRB
2015 & 2018 IBC approves WRB exceptions based on material properties and fuel load potential

High-rise Fires in the United States

The U.S. record of building fire safety reinforces the value of the code for tested and code compliant materials.

- 1997 Eldorado Hotel, Reno
- 1998 Palace Station Hotel, Las Vegas
- 2007 Water Club Tower, Atlantic City
- 2008 Monte Carlo Hotel, Las Vegas

None of the above fires were associated with tested and compliant assemblies.

Source: N. White, M. Delichatsios, Fire Hazards of Exterior Wall Assemblies Containing Combustible Components (2015)

High-rise facade assemblies that do not comply with NFPA 285 can compromise:

- Fire safety
- Building durability
- Human health and safety

Fire safety will continue to be a critical component of modern buildings and can be improved through stringent safety testing, code enforcement, and compliance—as shown by the U.S. fire safety record.

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