

Comprehensive Guidelines on Cables and Fire Safety from the Industry



In the event of a fire, **three critical factors determine your ability to find an escape route: smoke development, visibility, and the level of toxic substances in the air.**

LSHF flame retardant cables produce significantly less and lighter smoke than traditional PVC cables, and the smoke is far less toxic. This means better visibility and more time to find an escape route, increasing your chances of survival.

Installation cables must be fully compliant with European CPR requirements, include a Declaration of Performance (DoP) and carry the CE marking.

All in all, LSHF cables guarantee better visibility and more time to find an escape in a burning area and thus an increased chance of survival.

PVC CABLES	LSHF CABLES
• Heavy smoke formation	• Reduced smoke formation
• Black smoke, hard to find exits	• Light smoke, easy to find exits
• Lots of toxic gases, obstruct evacuation	• Fewer toxic gases, easier to evacuate
• Creates hydrochloric acid that destroys electronics and corrodes metals	• Creates a white harmless powder, spare metals and electronic devices
• Inhibits sanitation, longer break	• Easier to sanitise, shorter production interruption
• Harmful to the environment, contain phthalates and dioxin	• Better for the environment, contain no phthalates and dioxin



Note: The images above are simulations and do not represent real-world data or objects.

What are the main differences in fire safety between LFH cables and PVC cables related to the CPR?

When it comes to fire safety, the choice of cables can significantly impact the overall safety of a building. Two common types of cables are Low Fire Hazard (LFH) cables, also known as Low Smoke Zero Halogen (LSZH) cables, and Polyvinyl Chloride (PVC) cables. Understanding the differences between these cables, especially in relation to the Construction Products Regulation (CPR), is crucial for ensuring safety in the event of a fire.

Material Composition and Fire Safety

LFH cables are made from halogen-free materials, which means they do not release halogen gases when burned. This is a significant advantage in fire safety because halogen gases can be highly toxic and corrosive. In contrast, PVC cables contain chlorine, a halogen, which can release toxic gases such as hydrogen chloride when burned. These gases can cause severe health issues and damage electronic equipment.

Smoke Emission

One of the key differences between LFH and PVC cables is the amount of smoke they produce during a fire. LFH cables are designed to emit very low levels of smoke, which helps maintain visibility and reduces the risk of smoke inhalation for occupants. This is particularly important in evacuation scenarios where clear visibility can save lives. On the other hand, PVC cables produce a significant amount of dense smoke, which can obscure visibility and hinder evacuation efforts.

Compliance with CPR

The Construction Products Regulation (CPR) classifies cables based on their reaction to fire, including parameters such as flame spread, heat release, and smoke production. LFH cables typically achieve higher CPR classifications (e.g., B2_{ca}, C_{ca}) due to their superior fire performance. These classifications indicate that LFH cables are less likely to contribute to the spread of fire and produce less smoke and toxic gases. PVC cables, however, often fall into lower CPR classifications (e.g., D_{ca}, E_{ca}), reflecting their higher risk in fire situations. Even when covered under CPR classification C_{ca} such as the LFH cables, they still emit more smoke than LFH cables which significantly reduces visibility in case of fire.

In summary, LFH cables offer significant fire safety benefits over PVC cables, particularly in terms of reduced smoke emission and the absence of halogen gases. Compliance with CPR further underscores the importance of choosing the right type of cable for specific applications. By opting for LFH cables in high-risk environments, we can enhance safety and protect both people and property in the event of a fire.

Are there any economic benefits to using LFH cables instead of PVC cables?

In the realm of electrical and communication cabling, the choice of materials can have significant implications not only for safety and environmental impact but also for economic considerations. Low Fire Hazard (LFH) cables, also known as Low Smoke Zero Halogen (LSZH) cables, present a compelling alternative to traditional Polyvinyl Chloride (PVC) cables. While the primary focus often lies on their safety and environmental benefits, LFH cables also offer notable economic advantages.

Reduced Damage

One of the most significant economic benefits of LFH cables is their reduced potential for damage in the event of a fire. Unlike PVC cables, which release thick smoke and corrosive gases when burned, LFH cables produce minimal smoke and no halogen gases. This characteristic is crucial in protecting sensitive equipment and infrastructure. The corrosive nature of the smoke from PVC cables can cause extensive damage to electronic devices, machinery, and building materials, leading to high repair and replacement costs. In contrast, the use of LFH cables can significantly reduce these costs by minimizing the extent of damage.

Lower Insurance Premiums

Insurance companies could benefit from recognizing the reduced risk associated with LFH cables. Buildings and facilities equipped with LFH cables are less likely to suffer severe damage in the event of a fire, resulting in lower claims for property damage and business interruption. Consequently, insurance premiums for properties that voluntarily use LFH cables could be lower compared to those using PVC cables. This reduction in insurance costs can be a substantial economic benefit for businesses and property owners.

Long-Term Cost Savings

While the initial cost of LFH cables may be higher than that of PVC cables, the long-term savings can outweigh this initial investment. The reduced risk of fire-related damage and lower insurance premiums contribute to overall cost savings. Businesses that prioritize long-term financial planning and risk management can benefit significantly from the use of LFH cables.

Environmental and Corporate Responsibility

Contrary to PVC, LFH cables do not contain phthalates and dioxin. In today's business landscape, corporate responsibility and sustainability are increasingly important. Companies that choose LFH cables demonstrate a commitment to environmental stewardship and the well-being of their employees and customers. This commitment can enhance a company's reputation, attract environmentally conscious customers, and potentially lead to financial incentives.

Conclusion

The economic benefits of using LFH cables instead of PVC cables are multifaceted. From reduced damage and maintenance costs to potentially lower insurance premiums and enhanced safety compliance, LFH cables offer a compelling case for businesses and property owners. While the initial investment may be higher, the long-term savings and benefits make LFH cables a wise economic choice. As businesses continue to prioritize safety, sustainability, and cost-efficiency, the adoption of LFH cables is likely to increase, driving further economic advantages in the industry.

What are the environmental effects of LFH cables compared to PVC cables?

In the quest for sustainable and environmentally friendly materials, the choice of cabling can play a significant role. Low Fire Hazard (LFH) cables, also known as Low Smoke Zero Halogen (LSZH) cables, and Polyvinyl Chloride (PVC) cables are two common options, each with distinct environmental impacts.

PVC cables have been widely used due to their durability, flexibility, and cost-effectiveness. However, their environmental impact is a growing concern. PVC contains halogens, such as chlorine, which can release toxic gases like dioxins and hydrogen chloride when burned. These gases are harmful to both human health and the environment. Dioxins, in particular, are highly toxic and can cause serious health issues, including cancer and reproductive problems.

Moreover, PVC is not biodegradable and can persist in the environment for a long time. When disposed of in landfills, PVC can leach harmful chemicals into the soil and groundwater, posing a risk to ecosystems and human health. The production of PVC also involves the use of hazardous chemicals, contributing to pollution and environmental degradation.

LFH cables, on the other hand, are designed to minimize environmental impact. They do not contain halogens, which means they do not release toxic gases when burned. This makes them a safer option for both human health and the environment. In the event of a fire, LFH cables produce significantly less smoke and no corrosive gases, reducing the risk of damage to electronic equipment and infrastructure. The absence of halogens also means that LFH cables do not contribute to the formation of dioxins and other toxic substances during their lifecycle.

Despite the improved safety characteristics, there is still work to be done to facilitate the recycling and reuse of LSZH in order for it to also be superior to PVC.

Why are LSHF Cables Recommended for Use in Public Areas?

In the realm of electrical installations, the choice of cable materials plays a crucial role in ensuring safety, especially in public areas. Two common types of cables are those with PVC (Polyvinyl Chloride) sheaths and those with LSHF (Low Smoke Halogen Free) sheaths. Understanding the differences between these cables and their relevance to the Construction Products Regulation (CPR) is essential for making informed decisions.

PVC cables are widely used due to their excellent electrical performance and cost-effectiveness. They are suitable for various industrial applications where their durability and flexibility are advantageous. However, PVC cables have significant drawbacks when it comes to fire safety. In the event of a fire, PVC cables produce dense black smoke and corrosive gases such as hydrogen chloride. These emissions can severely hinder evacuation efforts and pose serious health risks to individuals exposed to the smoke.

LSHF cables, also known as Low Smoke Zero Halogen (LSZH) cables, are designed to address the safety concerns associated with PVC cables. These cables are made from materials that do not contain halogens, which means they produce significantly less smoke or corrosive gases when exposed to fire. This makes LSHF cables highly recommended, if not mandatory, for use in public areas such as hospitals, airports, tunnels, and other places with high people concentration.

The primary advantage of LSHF cables is their ability to facilitate safer evacuations during a fire. The low smoke emissions improve visibility, while the absence of corrosive gases reduces the risk of inhalation injuries. Additionally, LSHF cables are fire retardant, which helps prevent the spread of fire.

Relevance to the Construction Products Regulation (CPR)

The European Construction Products Regulation (CPR) sets stringent requirements for the fire performance of construction products, including cables. Under the CPR, cables are classified based on their reaction to fire, with classes ranging from B2_{ca} to E_{ca}. LSHF cables typically achieve higher classifications due to their superior fire safety characteristics significantly improving the safety of individuals during a fire. Compliance with the CPR further underscores the importance of choosing the right cables for installations in public areas. By opting for LSHF cables, we can ensure a safer environment for everyone.

How do LSHF Cables Affect Visibility During a Fire?

In the event of a fire, visibility is a critical factor that can significantly impact the safety and evacuation of individuals. The type of cables used in a building's electrical system plays a crucial role in this regard. Low Smoke Halogen Free (LSHF) cables, also known as Low Smoke Zero Halogen (LSZH) cables, are specifically designed to enhance safety by improving visibility during a fire.

Traditional cables with PVC (Polyvinyl Chloride) sheaths produce, when exposed to fire, dense black smoke. This thick smoke can obscure visibility, making it difficult for occupants to find exits and for emergency responders to navigate the building.

LSHF cables are engineered to address the shortcomings of PVC cables. These cables are made from materials that produce significantly less smoke than PVC when burned. The smoke produced is typically light grey and less dense resulting in an improved light transmittance, which helps maintain better visibility in the affected area.

As it allows more light to pass through the smoke, it helps maintain better visibility. Clearer visibility helps occupants locate exits more quickly and reduces panic, which can lead to more orderly evacuations. Fire experts agree that people may have as little as two minutes to escape a burning building before it becomes too dangerous. This short window of time underscores the importance of having clear visibility. LSHF cables, by reducing smoke can significantly improve the chances of a safe and timely evacuation.

Emergency responders, such as firefighters, rely heavily on visibility to perform their duties safely and efficiently. Dense smoke from PVC cables can severely hinder their ability to locate and rescue trapped individuals, assess the fire's spread, and identify potential hazards. For emergency responders, better visibility means they can navigate the building more efficiently, locate more quickly individuals in need of assistance, and extinguish the fire more effectively.

The improved visibility provided by LSHF cables can make a significant difference during a fire.

Are LSHF Cables as Durable and Reliable as PVC Cables?

When selecting cables for various applications, durability and reliability are key factors to consider. Traditionally, PVC (Polyvinyl Chloride) cables have been the go-to choice due to their robustness and cost-effectiveness. However, with increasing emphasis on safety and environmental concerns, Low Smoke Halogen Free (LSHF) cables, also known as Low Smoke Zero Halogen (LSZH) cables, are gaining popularity.

Electrically, we can say that both PVC and LSHF cables are identical. Both cable types generally have the same XLPE conductor insulation, so operating voltages and maximum permissible currents are identical. It is mainly the outer sheath which is different. And consequently, it is mainly the external influences, the environmental conditions, that can make a difference on the durability of the cables.

PVC cables are known for their excellent durability. They are resistant to a wide range of environmental factors, including moisture, chemicals, and possibly UV radiation. This makes them suitable for both indoor and outdoor applications. Additionally, PVC cables are flexible and can withstand mechanical stress, which is why they are commonly used in industrial settings, in buried applications, and so on.

LSHF cables, on the other hand, are designed with safety in mind. They are made from materials that do not contain halogens, which means they produce less smoke and corrosive gases when exposed to fire. While LSHF cables may not be as flexible as PVC cables, they are still highly durable. They have a better reaction to fire, are resistant to chemicals and mechanical stress, making them suitable for a variety of applications. However, it is important to note that LSHF cables may not perform as well as PVC cables in extremely harsh environments, such as those with constant exposure to UV radiation or extreme temperatures.

When comparing the durability and reliability of PVC and LSHF cables, it is essential to consider the specific requirements of the application. PVC cables offer superior flexibility and resistance to a wide range of environmental factors, making them suitable for general use in various industries. LSHF cables, while slightly less flexible, provide enhanced safety features that are crucial in environments where fire hazards are a concern. Although they can also have economic benefits such as less damage to infrastructure in case of fire.

In conclusion, both PVC and LSHF cables have their strengths and weaknesses. PVC cables are highly durable and reliable for general use, offering excellent resistance to environmental factors and mechanical stress. LSHF cables, while not as flexible, provide significant safety advantages by reducing smoke and corrosive gas emissions during a fire. When choosing between the two, it is important to consider the specific needs of the application and prioritize safety in environments where fire hazards are a concern.

In which situations is the use of LSHF cables mandatory?

Although cables were not the direct cause of a number of major fires in recent history of Europe, it did cause the governments to impose increasing requirements for the use of safer materials such as LSHF cables.

- **The King's Cross Station fire (1987, United Kingdom):** This fire resulted in 31 fatalities. The fire started when a lit match was dropped onto a wooden escalator, igniting the grease and litter beneath it. While PVC cables were not the main cause of the fatalities, the King's Cross fire underscored the need for safer materials in public spaces, contributing to the broader discussion on fire safety and the use of materials like LSHF cables in various applications.
- **Mont Blanc Tunnel Fire (1999, France/Italy):** This fire in the Mont Blanc Tunnel resulted in 39 deaths and underscored the need for safer materials in transport infrastructure. This incident led to stricter regulations for tunnels and underground stations, including the use of LSHF cables.
- **Grenfell Tower Fire (2017, United Kingdom):** This tragic fire in a residential tower in London resulted in 72 deaths and exposed serious shortcomings in fire safety standards. Although the fire was not directly caused by cables, the incident led to a review of fire safety regulations, including the materials used in buildings.
- **Notre-Dame Cathedral Fire (2019, France):** Although this fire did not result in fatalities, it caused significant damage to a historic monument. The incident led to a renewed focus on fire safety in historical and public buildings, including the materials used for electrical installations.

The Construction Products Regulation (CPR) is a European Union regulation that sets harmonized rules for the marketing of construction products, including cables. The CPR classifies cables based on their reaction to fire, with categories ranging from A_{ca} (non-combustible) to F_{ca} (highly combustible). LSHF cables typically fall into the $B2_{ca}$, C_{ca} , or D_{ca} categories, indicating their superior fire performance compared to PVC cables.

The mandatory use of LSHF cables in Europe is a critical measure to enhance fire safety in public and high-risk environments. LSHF cables are designed to emit very low levels of smoke and no halogen gases when burned. This significantly reduces the risk of smoke inhalation and corrosive gas exposure, which are major causes of fatalities in fire incidents. Additionally, LSHF cables help maintain better visibility during a fire, facilitating safer and more efficient evacuations. They also protect sensitive equipment from corrosive gases, which can cause significant damage and operational disruptions.

- **Public Buildings:** In places like schools, hospitals, airports, and shopping centers, the safety of large numbers of people is a priority. LSHF cables are mandated to ensure minimal smoke and corrosive gas emissions in case of a fire, facilitating safer evacuations.

- **Residential Buildings:** In multi-story residential buildings, the use of LSHF cables is often required to enhance fire safety and protect residents from the dangers of smoke inhalation and corrosive gases.
- **Transport Infrastructure:** Tunnels, underground stations, and other transport facilities mandate the use of LSHF cables to ensure the safety of passengers and staff in confined spaces where smoke and corrosive gases can quickly become life-threatening.
- **High-Risk Areas:** Environments with critical infrastructure, such as data centers, control rooms, and power plants, require LSHF cables to protect sensitive equipment from corrosive gases and ensure operational continuity during a fire.

By minimizing smoke and corrosive gas emissions, LSHF cables help protect lives and property, ensuring compliance with European regulations and standards. Understanding these requirements allows for informed decisions that prioritize safety and regulatory compliance.



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