



# LOW SMOKE ZERO HALOGEN CABLES (LSZH CABLES)

## Frequently Asked Questions

### 1. What are halogens?

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Halogens are non-metallic elements found in the periodic table. The five halogens are fluorine, chlorine, bromine, iodine, & astatine. A common material in cables that contains halogens in the chemical structure is PVC. Halogens make cable jackets and insulation highly flame retardant. When burned, halogens emit a thick toxic smoke and become corrosive. These characteristics can cause damage to equipment and pose a safety concern.

### 2. Why consider halogen-free cable?

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Halogen-free wire and cabling products are seeing an increase in popularity. Halogen-free cables are used in consideration of issues including fire safety, fire damage prevention and the environment.

### 3. What does LSZH mean?

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LSZH stands for low smoke zero halogen. The compounds in the cable insulation and jacket have no fluorine, chlorine, bromine, iodine, or astatine. This means that the cable emits little to no toxic halogens and minimal smoke when in contact with fire. These are important safety precautions and they often appear together in wire and cable specifications.

### 4. In what applications can halogen-free cable be used?

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Halogen-free cable is intended for use in applications in which insulation with low toxicity, low smoke generation and low corrosiveness is needed. It is ideal for applications where many people are confined in a certain place. Examples include rapid transit, industrial, shipboard and commercial fields where human safety and protection of equipment is a concern.

### 5. Is there a difference between low smoke and zero halogen?

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Low smoke and zero halogen are not equivalent. Low smoke cable emits a thinner and clearer smoke when burning. This feature makes evacuation and firefighting efforts much easier and safer. A cable may be low smoke and still contain toxic halogens. Zero halogen means that the cable does not contain fluorine, chlorine, bromine, iodine or astatine. Zero halogen cable may still emit a thick smoke when burned. Both properties are not always needed for all cables. Check specifications to be sure that the cable meets both requirements if necessary for your application.

### 6. What are the tradeoffs of LSZH cable?

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LSZH can be a direct replacement for "generic" PVC-based cables in most applications. The temperature range of LSZH material is a bit more restricted than for PVC: -20°C to +75°C for LSZH and -50°C to +90°C for PVC. Applications requiring extended temperature capabilities, wide resistance to chemicals, or other special needs may not be suited to LSZH cable. LSZH cables are little expensive than PVC counterparts. The safety they offer means they offer more value that goes beyond acquisition costs. These cables can prevent harm to people and also prevent damage to hardware system in the event of a fire.



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### 7. Can LSZH pass a flame test?

Yes. LSZH may pass a standard flame test. To determine how a LSZH cable will react in a fire, the following five criteria are considered:

- How easily the cable will catch fire
- How quickly the fire will spread along the cable
- How much smoke is produced upon combustion
- How toxic are the byproducts
- How corrosive are the byproducts.

### 8. Aren't wires and cables already fire resistant?

Many cables are tested to such flammability standards as IEC 60332-1-2, EN 60332-1-2 (Cables vertically mounted, length of charred cable  $\leq$  540mm) is a basic test of the flame resistance of a wire or cable. A flame is applied five times to a vertical-hanging wire for 15 seconds each. After each flame application, the wire must extinguish within 60 seconds. In addition, neither a flag near the top of the cable nor the cotton batten below the cable can be ignited during the test. Notice the test is to see if the cable self-extinguishes after the flame is removed. But what if the flame isn't removed? Plastics burn and melt in a fire. LSZH cables will also burn. The important thing is that they don't emit heavy smoke or toxins.

### 9. What should be considered when choosing LSZH?

When choosing LSZH products, factors such as the environment and price should be considered. An environmental factor such as the temperature of the installation could reduce the flexibility of the cable. Will the application be in an open area or confined? Will other flammable material be present? Low smoke zero halogen cable also tends to be higher in cost. Consult an expert from Fast Cables Limited to find the best fit for your application.

### 10. Who defines LSZH wire and cable?

As of yet, there is no universal definition of what exactly constitutes a LSZH material. There are some variations depending on which definitions and test procedures you use. One widely used approach is to qualify your wire or cable to the following IEC requirements:

- IEC 60332-1: Flammability
- IEC 60754-1 and 60754-2: Acid Gas Generation
- IEC 61034-2: Smoke Emission.

Fast Cables complies with the IEC requirements.

- IEC 61034-2 Measurement of smoke density of cables burning under defined conditions
  - A minimum light transmission value, expressed as a percentage light transmittance, is recorded during a fire in a 3 metre cube area.
  - The recommended light transmission value is greater than 60%.
- IEC 60754 Test on Gases evolved during combustion of materials from cables
  - Part 1: Determination of amount of halogen acid gas
    - Halogen acid evolved after 60 minutes burn time is captured, absorbed into a solution and analyzed for pH and conductivity.
    - The level of hydrochloric acid measured in the test solution must be less than 5mg/g.
  - Part 2: Determination of degree of acidity of gases for materials by measuring pH and conductivity
    - Gases produced after 30 minutes burn time are captured, absorbed into a test solution and analyzed for pH and conductivity.
    - The pH value of the test solution should not be less than 4.3
    - The conductivity value of the test solution should not exceed 10 $\mu$ S/mm.

\*For further information contact your Fast Sales Representative or email [cr@fast-cables.com](mailto:cr@fast-cables.com)

PAGE 2