Fast CABLES

Low Smoke Zero Halogen (LSZH) Cables

The cable you can trust with the service you deserve!

What are Halogens?

- Halogens, Group 17 on Periodic Table, include:
  - Chlorine
  - Fluorine
  - Bromine
  - Iodine
  - Astatine
- Highly reactive
  - Produce bio-accumulative and toxic chemicals
  - Fire – hydrogen chloride/fluoride/ bromide/iodide
    - ✓ **Water – hydrochloric/flouric/bromic/iodic acids**
  - toxic to environment and humans in sufficient quantities

What are Halogens?

Persistent Bio-Accumulative (PBT) and Toxic Chemicals

- PBT pollutants are chemicals that are
  - Toxic
  - persist in the environment and
  - bio-accumulate in food chains
- Pose risks to human health and ecosystems
- Transfer rather easily among air, water, and land, and span boundaries of programs, geography, and generations.

Source: US Environmental Protection Agency (EPA)

Effects of Halogens

Environmental Example

- Chlorine exposed to hydrogen in a fire
  - Hydrogen Chloride: Toxic, corrosive, colorless gas
  - Attacks metals & limestone, resulting in corrosion to buildings, monuments and natural rock forms
  - Contributes to acid rain, resulting in pollutants being transported throughout the atmosphere
- In the upper atmosphere, chlorine-containing molecules have been implicated in the destruction of the ozone layer

Why are Halogens used?

Materials that contain halogens

PVC, CPE, Neoprene, FEP, and flame retardants are commonly used because they are durable, resistant to fire, and relatively inexpensive

Compound	Use
Polyvinyl Chloride (PVC)	**Jacket (CMR & CMP)**
Flame retardants	**Cross-web members, insulating materials and jackets**

What is a LSZH Cable?

- A Low Smoke Zero Halogen (LSZH) Cable burns cleanly and does not contain halogens.
- Manufacturers must ensure that their cable designs incorporate non-halogenated materials for both cable insulation and the cable jacket.
- IEC has developed International Standards which state what constitutes a Low Smoke and Non Halogen Cable
  - IEC 61034-2
  - IEC 60754 Part 1 and 2

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 60754-1

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.

IEC 60754-2

Test on Gases evolved during combustion of materials from cables

- 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 10µS/mm.

LSZH - Benefits

- **Safety**

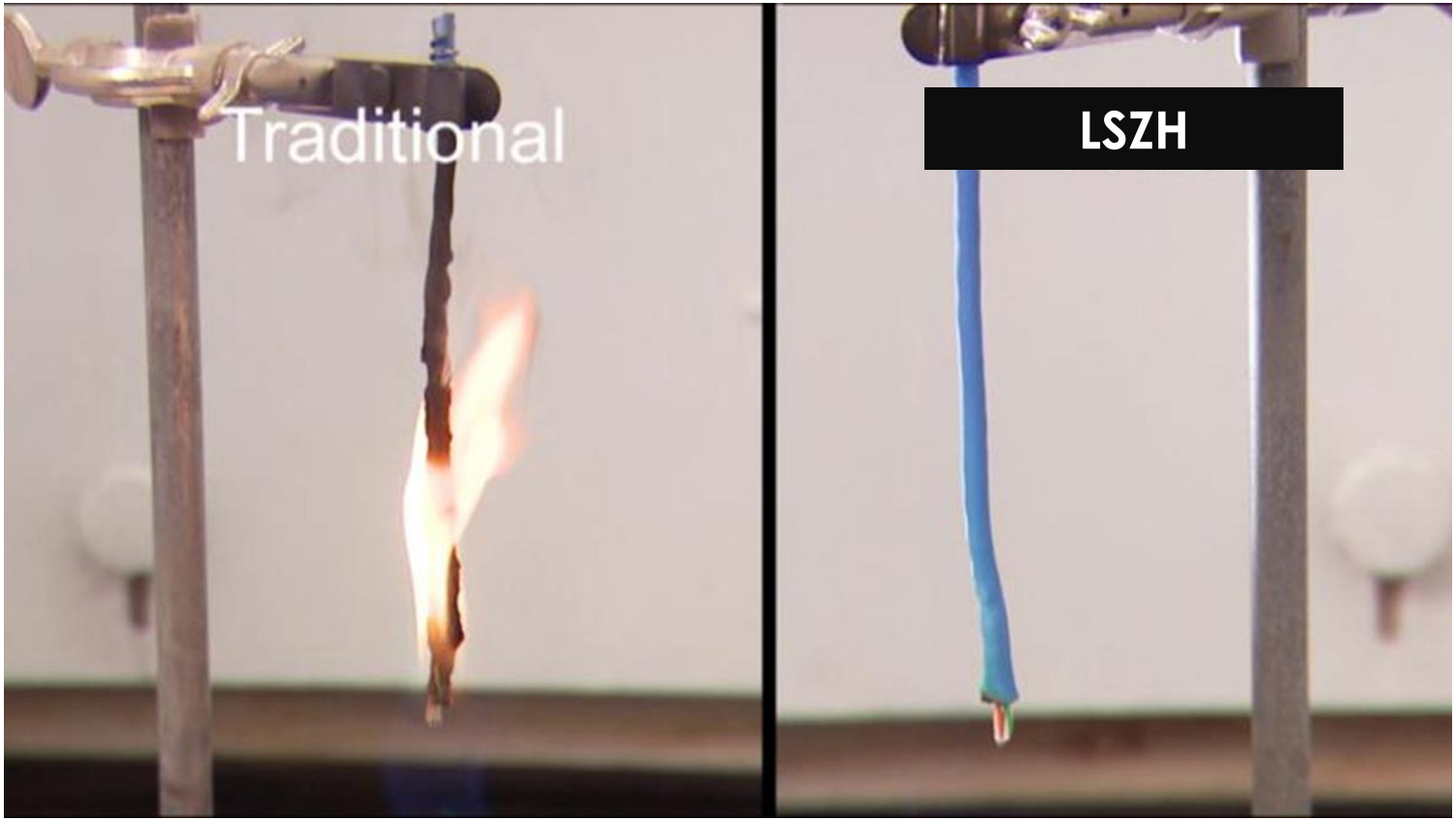
  LSZH minimizes the effects from smoke and harmful corrosive gases in event of combustion

  - ✓ *Low smoke* - easier visibility in exiting area & reduced danger of smoke inhalation
  - ✓ *low toxicity* - no harm to people from halogenated gases

- **Superior flame retardancy**
  - to reduce spread of fire

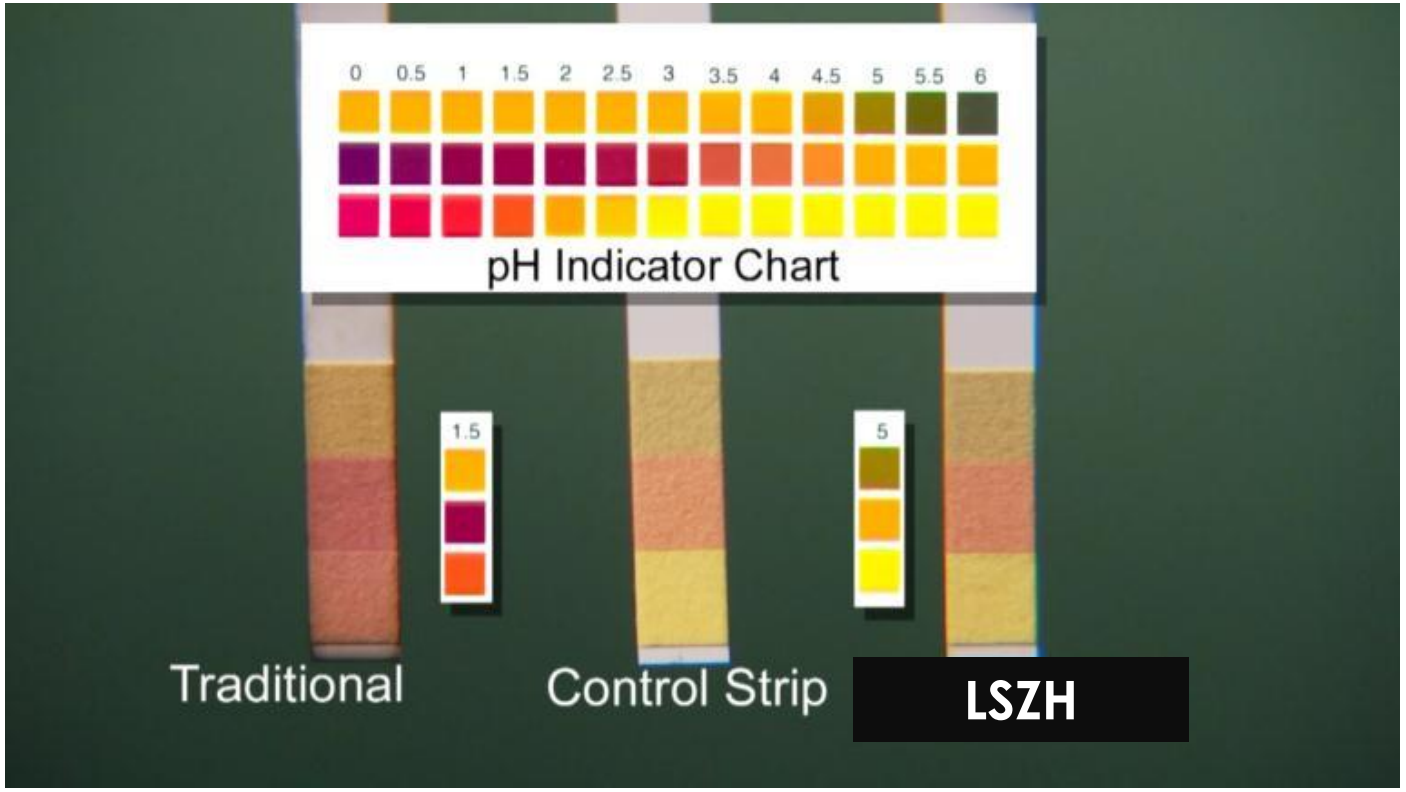
- **Durability**

LSZH - Benefits



LSZH - Benefits

Acidity Indicator Test



LSZH - Applications

LSZH cables are suited to applications such as

- Rapid transit
- Industrial
- Commercial (high rise buildings, shopping malls, cinemas, hotels, etc.)

& similar confined-space applications.

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