

Singapore-- [Media OutReach](#) --3 October, 2013-- On 27th January 1967, a fire broke out in the space capsule cabin of the Apollo 1 mission, killing all the three astronauts onboard. The autopsy report revealed the primary cause of death for all three astronauts as cardiac arrest caused by inhalation of toxic smoke and fumes from combustible material onboard the craft. Since the horrific incident, flame retardant materials became an important part of aerospace and defense engineering.

Modern aircrafts depend on sophisticated "fly by wire" electronics and a large Airbus A380 can contain 500 kilometers of wire onboard. It becomes critical to be able to identify the wires easily and accurately among a rat's nest of cables. Flame retardant wire wraps are used for identifying wires and cables in the aerospace and defense industries. The new polyimide material is self-extinguishing and can prevent flames from propagating, delivering efficiency in wire identification and fire safety simultaneously.

Because of the high stakes and risk in the aerospace and defense industries, stringent regulations and compliance policies are enforced to minimize and eliminate fire in aviation. For example, the Federal Aviation Administration (FAA) has identified wire identification wraps and labels as an in-flight fire risk, and developed strict requirements (FAR 25.853 and FAR 25.855) for fire protection). Other standards include ASTM E662 for surface flammability of materials, SAE-AS-81531 for marking of electrical insulating materials and MIL-STD-202G for resistance to solvents.

Understanding flame retardant wire wrap materials

There are many requirements that go into a flame retardant wire wrap material, but there are four must-have absolute technical properties that work together to protect against and prevent fire in electrical systems. The four main technical properties that distinguish the flame retardant wire wrap material are:

1) Flame Retardant properties

A flame retardant wire wrap must withstand combustion and delay the passage of flame for a known time period, either by way of cooling, forming a protective layer or by dilution. The ASTM D 1000 tests require the material to contain any flame along the wire and extinguish it immediately upon contact with the wire wrap.

2) Chemical Resistance

The flame retardant wire wrap material must also resist incidental chemicals and solvents it comes into contact with during repair and maintenance, and the film and information on the label must remain legible for the life of the product. A good wire wrap material will be tested by staying immersed for 15 minutes in chemicals such as JP-8 jet fuel, methyl alcohol, isopropyl alcohol, 10% NaOH, 10% sulfuric acid, 5% Alconox detergent, MIL-H-5606 oil and deionized water.

3) Strength & Wrap

Wire wrap materials must be tested to be strong enough, yet flexible enough to wrap around a 0.125 inch diameter wire and remain secure, without becoming unwrapped. A good wire wrap should also demonstrate high film integrity, maintainin its natural form without significant wrinkling or deformation despite being bent, curved, twisted or wrapped tightly around a wire. The data should remain legible, not easily pulled and misshaped by a technician.

4) High Temperature Resistance

Wire wrap materials must withstand extremely high temperatures without melting, fading or peeling. Flame retardant wire wraps should be exposed to elevated temperatures for 30 consecutive days 24 hour after application at room temperature. High quality flame retardant wire wraps will not show any signs of fading, discoloration, shrinkage, adhesion loss, ooze, material embrittlement, or topcoat cracking.

Selecting a vendor for flame retardant wire wraps

The aerospace and defence industries are governed by very stringent regulations pertaining to safety, and as a component developer and supplier it is of utmost importance that your products comply with the strict standards. The most basic requirement is to ensure the flame retardant wire wraps that you are considering have been tested rigorously to match or exceed the specifications.

Brady Helps You Understand the Importance of Flame Retardant Wire Wraps

Written by Australian Business

In addition, you should consider suppliers that are ISO certified with high-level quality standards, and can provide materials science experts for their solutions.

Outside of the top performance requirements of flame retardant, chemical resistant, strength, wrap and high temperature resistance, it can also be valuable to explore the cost benefit ratio as it relates to the performance requirements. The addition of software, ribbons and printers can furnish a complete solution for hassle free and easy implementation and use.

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