

Sheathing

Mechanical protection

The sheath (or jacket) offers isolation from the earth plane for any shielding of the cable. It is primarily used to provide mechanical protection from a wide variety of hazards. There is a wide range of materials that can be used for sheathing cables, all with their own advantages and limitations.

Habia Cable recycles waste material for re-use. For this reason Habia Cable will offer black sheaths wherever possible. Some materials have a lot of carbon black in them meaning that these materials cannot be coloured, they are only black. Other flame retardant materials use an additive that is naturally white in colour.

Abrasion

Measures the rugged properties of a material. Typically softer, more flexible sheaths will exhibit a high degree of abrasion loss. HFI 260 when used as a sheath exhibits possibly the best abrasion resistance.

Corrosivity

Although highly fire resistant, many materials will release toxic and corrosive gases once they eventually ignite. Corrosive gases can damage sensitive equipment such as circuit boards and consideration to this should be given when installing cable in potentially sensitive areas.

Flammability

The degree to which the sheath will burn and/or spread a fire once ignited. Most materials used by Habia Cable will self-extinguish once the flame source has been removed. With many different national and international fire standards in use, Habia Cable recommends IEC 60331 and IEC 60332 (in applicable parts) as these test the completed cables and are therefore more truly representative of the application. Some materials can be improved by flame retardant (FR) additives.

Another commonly requested test is flammability to UL 94. This method tests a small sample of the sheath material and does not assess the overall cable construction.

Flexibility

There are two aspects to this:

- Flexibility is the degree to which a cable can bend
- Flex-life is the frequency over which a cable can be flexed without breaking.

Materials may have poor flexibility, but are actually so strong that they can exhibit a very good flex-life.

Fluid resistance

Many fluids will actively break-down the chemical bonds of the sheath. An effect magnified when the fluids are at temperature (such as an engine-bay). Cross-linked materials are particularly good at resisting damage from chemicals. Where the sheath is concerned, this is the degree to which water can either be absorbed by the sheath (swelling its size) or permeate through it, flooding the cable interstices and allowing water to track back up to the connector.

Radiation

As with fuels and oils, continued exposure to radiation will break-down plastic. Many different measurement scales exist, however the most common are Rads and Grays. Habia Cable will quote the Total Integrated Dose (TID) in Gray (Gy) unless otherwise specified (e.g. 2×10^5 Gy).

Smoke & Fume

This refers to the level of smoke that is generated by a material under fire conditions. This is of key importance where visibility must not be impeded (for example: the route to an exit). As with flexibility and flex-life there is no link between smoke corrosivity and smoke generation, so whilst materials such as fluoropolymers might be very corrosive, they actually generate very little smoke.

The other side of smoke corrosivity, halogen content refers to the toxic gases that can be emitted by the sheath under fire conditions. Halogens can affect health and therefore halogen free cables should be installed in areas of high foot-traffic and/or enclosed spaces.

