

## Wire & Cable Solderability / Shelf Life / Intermettals

Dear Distributor,

It has been brought to our attention that some distributors are unaware of the information held on the Tyco Electronics intranet with reference to Wire & Cable Solderability, Shelf Life, or Intermettals. All information on the above subjects can be found on the 'Search / Help' menu bar of ChannelXchange, either under 'FAQ' or 'Glossary' tabs. Direct links are as follows:

<http://raychem-cx.tycoelectronics.com/Applications/FAQ/>

<http://raychem-cx.tycoelectronics.com/Applications/Glossary/>

Essentially, the information contained within these links is:

**Solderability** - All tin (Sn) plated copper (Cu) conductors exhibit *reduced* solderability with elapsed time after manufacture. Where tin plated copper is stored at a temperature below 25°C and at a humidity of less than 70% a practical level of solderability should be retained for about 18-24 months from the time of manufacture of the conductor. Where long term retention of good solderability is essential we recommend the use of silver plated copper conductors which do not exhibit the reactions described below which reduce solderability.

There are two separate mechanisms involved in reducing solderability:

The oxidation of the tin surface. The development of the surface film is greatly accelerated by elevated temperature and particularly by the presence of moisture.

The progressive conversion of the free tin layer into one or both of the copper tin intermetallic compounds (Cu<sub>6</sub>Sn<sub>5</sub> and Cu<sub>3</sub>Sn). The development of these bronzes which are more difficult to solder than tin, occurs via a diffusion mechanism (primarily Cu into the Sn). The time required to consume all of the available tin will depend upon the initial thickness of the plating and the temperature of service and/or storage.

Poor solderability of aged conductor due to either mechanism may normally be overcome by the use of a mildly activated rosin flux (RMA type) and in more severe cases by a fully activated rosin flux (RA type). A particularly long and harsh service life may produce a conductor which cannot be re-soldered if a need arises for subsequent repair or modification. In such cases we recommend the use of a crimped termination technique which, because of the high force and mechanical deformation involved, can produce a satisfactory termination.

**Silver and nickel plated conductors are not subject to these deterioration mechanisms**

## Shelf Life (WC)

Shelf Life When stored under typical conditions of less than 30°C and less than 70% relative humidity, the shelf life of the wire is effectively unlimited. Where the product contains a standard tin plated or bare copper conductor or braid there will be a progressive reduction in the solderability with increasing storage time. Under the conditions mentioned above excellent solderability should be retained for about one year from manufacturing date, but if this is an important property it should be checked before use. The suitability of the tin plated or bare copper conductor for use with crimped or welded termination techniques Will not be affected by storage time.

Silver and nickel plated conductors are essentially unaltered by normal storage.

## Intermetallics

These cause colour discolouration of the tin which may appear grey in colour. The colour change will have no detrimental effect to the performance of the conductor except increase soldering time.

The intermetallics of copper & tin are more difficult to solder than pure tin and so the solderability of the tin reduces with storage time.

If the finished insulated wire is stored under normal conditions, a 12 month shelf life should be expected before the soldering performance starts to degrade. Therefore if soldering is a requirement, this should be considered.

Tyco wire has a copper inhibitor in its insulation formulation and will not be affected by copper migration

**Please ensure that the responsible employees within your organisation are aware that this information and any consequent updates, is available on line.**

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