

**Technical
Bulletin**



Fire Industry Association

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**The use of maintenance free
connections**

Frequently asked question

Is it permissible for technicians to utilise maintenance free connectors when joining fire detection & fire alarm circuit wiring?

The Facts

BS 5839-1, which provides guidance for designing, installing, commissioning, and maintaining fire detection & fire alarm systems in a non-domestic setting, recommends that whenever possible, cables should be installed without external joints. An exception to this recommendation is allowing joints located at or within system components, for example, control equipment, manual call points, fire detectors, or sounders.

Where a joint is made at a component of the system (in the backbox for a manual call point or detector for example), the cables can be joined using any form of suitably rated means of connection, e.g., non-fire-resistant connector blocks or maintenance free connectors.

This exception is based on the premise that in the event of a fire, a detector should promptly sense the properties of combustion, or a manual call point might be activated, both raising the alarm allowing adequate warning for any personnel to evacuate prior to a joint failing and compromising the system.

Another common misconception amongst technicians within the industry, is that any joint external from a component of the system, should use a metal / galvanised box. The material of the box is not referenced within BS 5839-1, but it may be necessary to consider the use of a plastic junction box where there is a need to maintain isolation from true earth specifically if using MICC cable, or where lightning protection systems are present.

When a cable joint is made externally from a system component, BS 5839-1 recommends using terminals comprised of materials that can endure temperatures and durations similar to the cable itself. In this context, the standard recommends the use of ceramic terminal blocks, or an alternative might be the use of butt joints with glass fibre sleeving. Both methods provide a fire resistance of at least 1000 degrees Celsius¹.

It is important to follow this recommendation, as if a fire were to start in an area of the building with no detection installed, using a suitably fire rated means of connecting cables, reduces the risk of circuit wiring damage, ensuring the system's ability to detect and provide a warning of fire.

Standard fire-resisting cables, often denoted as PH30, are designed to have a survival time of 30 minutes in a fire condition, while enhanced fire-resisting cables (referred to as PH120) have a survival time of 120 minutes.

It's important to note that maintenance-free connectors typically operate up to temperatures much lower than the temperatures used when testing fire resistant cables. In some cases, approximately 105 degrees Celsius².

In the event of a fire, temperatures can exceed this threshold significantly. This raises concerns where a fire could affect the integrity of the cabling if a joint utilizing a non-fire-rated maintenance-free connector were to fail in a fire event.

Because of their lower operating temperature rating and inability to match the fire-rated duration of the cable, non-fire-resistant terminals such as maintenance free connectors are **not** suitable for use in the critical signal path³ of fire detection and fire alarm systems.

¹ Ceramic connector datasheet ([CamdenBoss](#)) & Fibre glass sleeving datasheet ([Silicate Sleeves 1200°C \(final-materials.com\)](#))

² Wago 221-413 Compact Splicing Connector datasheet (www.wago.com/221-413)

³ Components and interconnections between every fire alarm initiation point (manual call point or automatic fire detector) and the input terminals on, or within, each fire alarm device and (where provided) transmission equipment within the premises for routing of signals to an ARC.