

Not all fuses are created equal!

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There is a difference.....

Fuses are fuses...right? They've got a simple job to do so they must all be the same....
But are they all the same? As long as you get the current & voltage rating correct, does the choice of brand matter?

Absolutely Yes! As with all products, there are various degrees of quality and there are those that are simply unique and exceptional. SIBA is a German manufactured fuse brand that is one of those rare exceptional products. What makes a fuse exceptional?

Fuses are primarily designed to protect equipment from two dangerous electrical events. They are (1) Overloads, and (2) Short Circuits (also known as 'faults'). In the case of an overload, the current rises above the normal operating current and if it stays there for a period of time, the fuse element melts and the fuse opens the circuit. In the case of a short circuit, the current rise is of such magnitude and speed that a fuse usually opens the circuit very quickly. All quality fuses will be triggered by such events and should open their respective circuit. This is the traditional & common application of the fuse.

However, certain circuits can experience another event which has proven to be extremely dangerous.....*temperature rise*.

With many high voltage fuse applications, the temperatures can be several 100°C and this can normally be absorbed by the fuse link and the switchgear. However, in some circumstances, the core temperature of the fuse can rise very slowly. Some of the causes of excessive temperature rise include:

- Ø Fuse links switch a fault current below their minimum breaking current.
- Ø Faults between the windings in the transformer can cause a long lasting fault current.
- Ø The transformer is operated above its capacity limit.
- Ø The fuse rated current chosen for transformer protection is too small.
- Ø Poor contacting.
- Ø Fuse link current carrying capacity can be reduced due to transient influences damaging individual elements of the melting element system.
- Ø A lack of air convection or poor switchgear heat dissipation
- Ø Other factors causing a very slow rise in the circuit current over a long period of time.

This situation can be disastrous because the fuse element could slowly melt while not separating (arcing) to open the circuit. Molten metal can still conduct electricity so the fuse will remain conducting, but the element has melted and has warped from its original design, thus not able to operate as a heat sensitive circuit protection device. If the current continues to rise slowly, the equipment is unprotected by the fuse, possibly leading to a catastrophic situation.

Alternatively, if the circuit does experience an over-current after the fuse element has melted, the performance of the fuse will be unpredictable and unreliable. Furthermore, on-going heat stress significantly stresses and ages switchgear equipment.

During testing to IEC420, SIBA thought that it would be highly advantageous to reduce the temperature during and after a current interruption to protect the switchgear. SIBA have done two things to deal with this potential situation.

(1) SIBA have developed a melting activator that has reduced the internal operating rupture temperature of the fuse from 960°C to a much cooler 230°C. Now, the opening of the switchgear is no longer caused by the arcing of the melting element but the striker pin mechanism is triggered by the Melting Activator which in turn acts on the 3 pole trip-free release of the switchgear.

(2) The development of the melting activator has allowed the use of a new type of temperature limiter device in the fuse to activate a striker pin, which in turn operates the relay that protects the asset. This temperature limiter mechanism is a technology that is unique to the SIBA brand and has rapidly become the first choice for electrical engineers around the world. The operating points of the temperature limiter are in a range where temperature rises last longer than 10 minutes.

Incidentally, some high voltage fuse manufacturers still use the old technology of a pyrotechnic device to operate the fuse striker. SIBA believe that a mechanical spring-loaded striker pin system is a far more reliable and effective system and the temperature limiter mechanism has been incorporated into this system.

So, what makes a fuse exceptional?

SIBA have managed to develop, type test and certify high voltage fuses equipped with a unique temperature limiter mechanism that not only work as current limiting devices but also as temperature limiting protective devices!

That is exceptional and that's what makes SIBA the world's premier quality fuse brand. Now that you know that a temperature limiter function exists within a fuse, why would you choose to protect expensive switchgear without it?

SIBA.....proving that not all fuses are equal!