

# Fire performance Silicone Rubber

- *Family: Thermosetting (Cross-linked elastomeric insulating compound)*
- *Use: High-temperature fire-resistant insulation*

## General characteristics

*Silicone rubber is a polyorganosiloxane, unlike most other rubber materials, which are based on carbon. Silicone rubber is based on silicon which imparts some unique properties, an important one being that when involved in fire, whilst other elastomers produce a carbon-containing ash, silicone rubber decomposes to a residue of electrically insulating pure silica, and cables insulated with silicone rubber continue to have limited functionality. As the silica ash is brittle, it is usual to provide additional means of containing the ash, such as a glass braid over the insulation to ensure that the silica ash remains in-situ around the conductor.*

*A new family of silicone rubbers have been developed, which are known as “ceramifiable” silicones, which behave in an exactly opposite manner to the traditional fire performance grades. Whereas traditional fire performance grades are designed to be low expansion, when involved in a fire, the*

*“ceramifiable” grades are designed to intumesce and provide a thermal barrier and a much stronger char.*

*Because the polymer of these ceramifiable materials is still based upon silicone, they retain a wide operating temperature range; however they can still be attacked by oils, fuel oil and solvents, but they are resistant to ozone and usually have good electrical properties, certainly for usual low voltage (up to 600/1000V) use.*

*If ceramifiable silicone has a weakness, it is that of low-temperature ceramization performance where the temperature of the fire does not fully ceramify the compound matrix*

## **Processing**

*As with traditional silicone rubbers, including low expansion grades, the basis of ceramifiable silicone is raw silicone gum usually compounded with carefully selected reinforcing fillers, fluxing agents, low melting point glass frit, nano silica and processing aids; conventional vulcanizing agents are used as in standard rubber industry practice.*

*Ceramifiable silicone rubbers are applied by conventional single screw extruders and then subject to a cross-linking process using live steam or infra-red curing tunnels.*

# Uses of material/Cable types

*Fire performance silicone rubbers are almost exclusively used as the insulation on low voltage limited circuit integrity, fire resisting cables.*

## Standards

*Cables manufactured from Fire Performance Silicone Rubber are included in the following standards:*

- *IEC 60092 – series*
- *IEC 60331*
- *BS 5266*
- *BS 6387*
- *BS 7629*
- *BS 7655*