Resistance to radioactivity of SIGRAFLEX® sealing materials

Graphite is highly resistant to all types of radioactivity. For this reason, graphite can even be used in the hot core of a reactor (see pebble-bed reactor, graphite moderator), where most metals or alloys rapidly fail as a result of the high neutron flux. The use of graphite as a sealing material is limited mainly by the stability of the flange and valve material, which is usually lower than that of graphite. Radioactivity thus has no major influence on the sealing characteristics of SIGRAFLEX or its other properties. For some decades, SIGRAFLEX seals have been successfully used as flat, profiled and special elements in nuclear and other power stations.

To the best of our knowledge, SIGRAFLEX has been used for many years without problems in nuclear power stations with radiation doses of 5×10^6 rad (gamma and neutron radiation).

Other publications known to us quote figures of 1.5×10^9 rad (gamma radiation) or 5.5×10^{21} NVT* (at 1000 °C).

SGL Carbon has international experience and started in the 1960th to supply graphite for gascooled, graphite moderated reactor types. For future generation IV reactors the Very High Temperature Reactor (VHTR) is one among others of the selected concepts. The two designs, the pebble-bed reactor and the prismatic block reactor, are state of the art of current technology in VHTR reactors. They take advantage of the inherent safety characteristics and exhibit improvements beyond the already demonstrated safety in former prototype reactor installations and commercial light-water reactors.

From our nuclear graphite experience special procedures and documents for nuclear-based applications/products have been developed to fit customer requirements.

SGL Carbon ensures traceability from raw material to finished products. External suppliers are assessed on a product-related basis and supplied goods pass an incoming analysis before entering the graphite foil production processes.

For final control all our products are tested in our own qualified labs or are outsourced to qualified laboratories.

* Integral neutron flux:
N = particle number, neutrons per cm^3
V = speed in cm/sec.
T = time in sec.

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