Advanced Applications

Radiation Processing for Improvement of Polymer Gaskets & Seals

Sterigenics Advanced Applications Radiation Processing Capability

Sterigenics Advanced Applications offers electron beam service and development centers located worldwide:

San Diego, CA

Gaithersburg, MD

Bridgeport, NJ

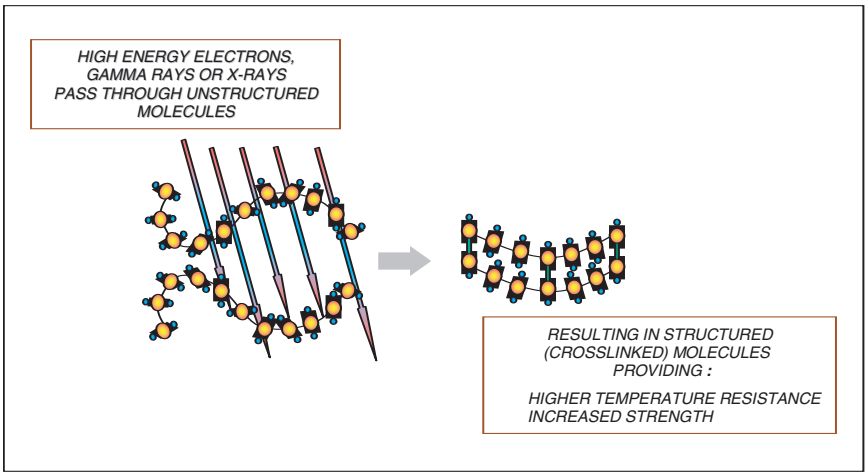
Rayong Province, Thailand

Espergaerde, Denmark

Shanghai, China

In addition, we operate 16 gamma service centers worldwide

We stand ready to work with gasket and seal manufacturers to optimize and validate radiation processing protocols for their products, to increase performance specifications and reduce costs.



How Sterigenics enhances the performance of seals gaskets

Sterigenics electron beam processing is a well-established and economical method of improving properties for polymer materials commonly used in gaskets and seals.

Electron beam processing involves introducing the polymer material to a stream of high-energy electrons from an electron accelerator. Free radicals and broken polymer chains initiated by the radiation in the polymers subsequently combine with others, resulting in a crosslinked material with a stronger network formed. Radiation crosslinking of polymers has many useful applications as a result of the improved mechanical and thermal properties of the material.

In addition to electron beam processing, polymeric materials may also be processed with gamma rays from Cobalt-60. Similarly, products may be processed with x-rays produced from electron accelerators. While industrial electron beam processing is usually more efficient, due to the higher applied dose rate, the net effect is often similar using gamma or x-ray processing. In fact, there are some products where gamma or x-ray processing may be more beneficial.

Advanced Applications

Radiation Processing for Improvement of Polymer Gaskets & Seals

Gasket and Seal Applications

Many industrial gaskets and seals are made of thermoplastic elastomers, such as PE, EVA, EPDM, nitrile rubber, neoprene rubber, styrene butadiene rubber (SBR), silicones and fluoroelastomers. The requirements for gaskets and seals made from these materials include good mechanical strength, superior thermal stability and strong chemical resistance.

A good example is EVA O-ring seals where properties, such as chemical resistance, environmental stress crack resistance and mechanical strength, are important. Since the O-ring may experience elevated temperature, thermal stability of the O-ring is also important. The chemical resistance and thermal stability of the un-crosslinked EVA can be significantly improved using radiation crosslinking. Figure 1 shows un-crosslinked EVA O-rings melt when heated to 204°C for ten minutes. However, when electron beam treated, the O-rings maintain their shape and dimension when heated at the same temperature for the same period of time.

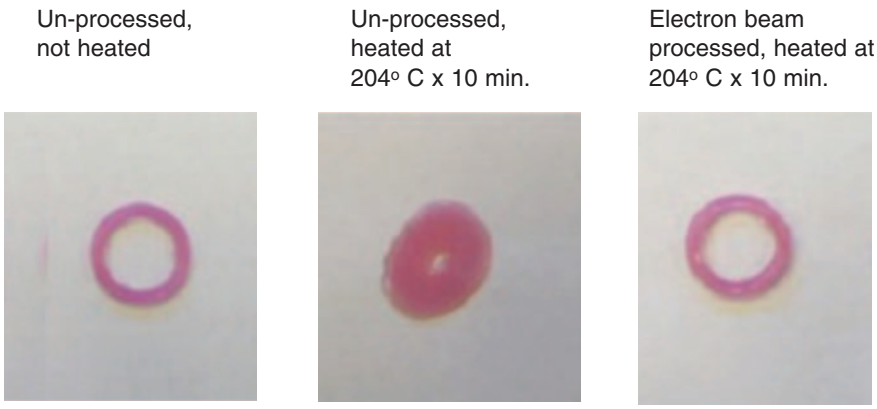


Figure 1. Effect of electron beam crosslinking on the thermal stability of EVA O-rings.
(Source: Sterigenics)

Gaskets and seals made with specialty polymers can also be improved, if the polymer is crosslinkable by electron beam processing (e.g., silicones and other synthetic rubbers).

Sterigenics
Advanced Applications
Toll Free: 888-727-7391
Outside US: 858-271-6330
www.sterigenics.com · materials@sterigenics.com