Hi-Tech Seals Inc.

Rubber Blooming

What is That White Dust on The Surface of my Rubber Seal?

This white, milky substance can appear on rubber components is called 'bloom'. Rubber blooming occurs when compounding additives migrate to the material's surface. It most commonly appears on nitrile, hydrogenated nitrile, and neoprene/chloroprene compounds.

Will it affect the seal's performance?

While rubber blooming may not be aesthetically pleasing, it is normal and purely superficial. It does not affect the quality of the moulded product. If its appearance is unacceptable, it can be removed easily by washing the part in water or a light mineral oil.

Since blooming is normal and doesn't affect the function of a seal, it isn't considered a defect or a contaminant.

What causes rubber to bloom?

Two common agents used in the rubber curing process are sulfur and peroxide. When these curatives aren't fully used up, they can appear on the surface as a white or grey dry powder.

Another chemical interaction that causes blooming is adding lubricants to the formulation to reduce friction. By design, the lubricant that is added is incompatible with the rubber.

This conflict results in the lubricating agent migrating to the surface, causing bloom. As the agent continually blooms, the component will continue to offer reduced friction over time. The elastomer's basic properties remain largely unchanged.

It is worth noting that all lubricants must be compatible with fluid systems and adjacent surfaces to prevent complications and failures. Lubricant can be organic or inorganic:

- Organic lubricants
  - Amides (flake or pellet form)
  - Waxes
  - Esters
  - Powdered PTFEs
  - Mineral oils
- Inorganic lubricants
  - Graphite (powder or flake form)
  - MoS_2 (molybdenum disulfide)

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