



## Elastomer Storage Guidelines

Rubber articles are subject to aging. Modern elastomer materials are more stable and have extremely long service lives, due both to the base rubber used and the further components mixed with it. Nonetheless, certain rules should be observed in the storage of rubber products.

The aging process is predominantly dependent on the following factors:

- Temperature
- Heat
- Sunlight
- Moisture
- Relative humidity < 65%
- Ozone and ionizing radiation
- Tensile stress on the component

As such, we can derive the following rules for storing elastomer seals:

- The storage temperature must remain below 25 °C
- There should be no direct heat sources in the storage area
- The seals should not be exposed to direct sunlight
- The seals must be protected from the effects of ozone and ionizing radiation
- The seals must be stored so as to avoid their being under tensile stress



Group	Materials	Shelf Life (in years)	Extension (in years)
1	NR, AU, EU, SBR	5	2
2	NBR, HNBR, ACM, AEM, XNBR, ECO, CIIR, CR, IIR	7	3
3	FKM, VMQ, EPDM, FVMQ, PVMQ, FFKM, Fluoroprene® XP, CSM	10	5

So as to fulfill these requirements, elastomer products should be packaged as follows:

All materials used for storage containers, to cover or to wrap the seals should be free of substances that can deteriorate or break down elastomers. Suitable packing materials include e.g. PE-coated paper, aluminum foil or non-transparent PE (min. 0.075 mm thick).

ISO 2230 provides guidelines for the storage and for determining the shelf life of vulcanized rubber products. This standard classifies elastomer products into three groups, with different shelf lives.

It is possible to receive extensions on the projected shelf life, but only after consultation with Freudenberg Process Seals. The following tests have been laid out by Freudenberg's Materials Development division for assessing elastomer parts after the expiration of their initial shelf life:

### 1. Testing in accordance with the respective product specifications

If the product specifications make no mention of such testing, the following procedures should be used:

#### 1.1. Visual inspection

Every part or component in a representative sample is to be checked for the following changes:

- permanent deformations, e.g. folds, wrinkles or flattened areas
- mechanical damage, e.g. cuts, cracks, worn or dissolved areas
- surface crack formation, visible under 10-power magnification
- changes to the surface, e.g. stiffening, softness, stickiness, discoloration or dirtiness

A list of key characteristics tested is to be made for the stored parts or components; it must include the following:

- a) the quantity stored for each part or component, the date of their initial packaging, the date of their being placed in storage
- b) the date(s) of each consecutive repacking
- c) the manufacturer's lot number, and the number of parts or components that is a representative sample of the whole.