



Q: What is the shelf life of Hutchinson molded rubber products ?

A: The shelf life (or storage life) of Hutchinson molded rubber products is dependent on many factors. The two most important factors are the elastomer (rubber) compound used in the molded product and the storage conditions of the product after molding.

As a general guideline for shelf life of molded rubber products, we typically refer to data published in Table 1 of MIL-HDBK-695 which lists the age resistance generally associated with products fabricated from various rubber compounds and is considered to be relatively conservative. ISO 2230 “Rubber Products – Guidelines for Storage” is also a useful reference.

The age resistance data from MIL-HDBK-695 and ISO-2230 is summarized below for rubber compounds most commonly used in Hutchinson molded rubber products. Most products molded by Hutchinson have a cure date embossed on the surface of the elastomer to facilitate shelf life monitoring and stock rotation.

<u>Type of Rubber</u>	<u>Chemical Name</u>	<u>Chemical Abbreviation</u>	<u>MIL-HDBK-695 Shelf Life</u>	<u>ISO-2230 Shelf Life</u>
Natural Rubber	Polyisoprene	NR	3 yrs max	5-7 yrs
Neoprene	Polychloroprene	CR	15 yrs max	7-10 yrs
Silicone	Silicone	Q	20 yrs min	10-15 yrs
Nitrile	Butadiene Acrylonitrile	NBR	15 yrs max	7-10 yrs
HNBR	Hydrogenated NBR	HNBR	-	7-10 yrs
Butyl	Isobutylene	IIR	20 yrs min	7-10 yrs
EPDM	Ethylene Propylene Diene	EPDM	20 yrs min	10-15 yrs
Hydrin	Epichlorohydrin	CO, ECO	-	7-10 yrs

MIL-HDBK-695 defines shelf life as *“The maximum period of time between the cure date and the date the elastomeric product is first removed or unpackaged for installation or fabrication into a component part of a subassembly, assembly, or system. During the shelf life time, the stored elastomeric product is expected to retain its characteristics as originally specified.”*

Furthermore, MIL-HDBK-695 assumes that *“each rubber product was packaged and stored in the manner prescribed, in order to minimize deterioration due to such factors as temperature, humidity, ozone, sunlight, oils, solvents, corrosive liquids and fumes, insects and rodents.”*

Depending on the exposure to the environmental factors above, changes in the physical properties of the elastomer in the molded product can occur which may effect performance. Hardening or softening of the elastomer effects the stiffness and damping characteristics of isolators. Surface cracking, crazing, and degradation of bonded edges can reduce the fatigue life of isolators.

The use of good storage practices can help mitigate aging effects when molded rubber products are stored for extended periods. Following are general guidelines for the storage of molded rubber products.

Temperature: Ambient temperatures for storage should be between 40°F and 80°F (5°C - 25°C) and parts should be stored away from localized sources of radiant heat.

Humidity: Relative humidity of approximately 75% is desirable and ideally should be controlled in conjunction with temperature to avoid condensation on parts.

Light: Protection should be provided to prevent exposure to direct sunlight and/or intense artificial light with a high UV content.

Radiation: Molded rubber products should be protected from sources of ionizing radiation.

Ozone/Oxygen: Avoid storing rubber products in areas where ozone generating equipment (electric motors, mercury vapor lamps, high voltage electrical equipment) is in use. Protect stored product from direct ventilation and air circulation, ideally in airtight packaging.

Loading: Molded rubber products should be stored/packaged in such a way as to avoid loading or deforming the rubber geometry to prevent permanent deformation and/or set.