

Shelf Life Guidelines for ARLON[®] Flexible Heater Substrate Product Series 27, 14, and 10

Summary

This Technical Bulletin outlines the shelf life and storage conditions of “27”, “14”, and “10” series flexible heater substrate products. It covers all products with “27”, “14”, or “10” in the third and fourth digit of Rogers Arlon[®] part numbers, such as 51276R015.

Background

“27”, “14”, and “10” series flexible heater substrate products contain uncured rubber layer(s). Flexible heater substrates with uncured rubber will lose shelf life while in transit and storage, similar to what happens with vegetables and fruit.

Storage conditions, such as temperature, play an important role in their shelf life. Datasheets for these series products state their shelf life is 6 months at 70°F. In the real world, however, storage temperature can not be exactly controlled at 70°F, due to shipping, warehouse conditions, handling, seasonal changes, etc.

It is important to understand shelf life at different storage temperatures to help in planning and adjusting production, shipping, and storage.

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Shelf Life at Different Storage Temperatures

Shelf life for these product series is below in Figure 1. As shown, storage temperature has a significant impact on shelf life. Furthermore, when these products are stored at >110°F, they start to partially cure during storage. Given this, it is important to avoid any storage temperature >110°F. On the other hand, product shelf life may be extended if storage temperature is <70°F.

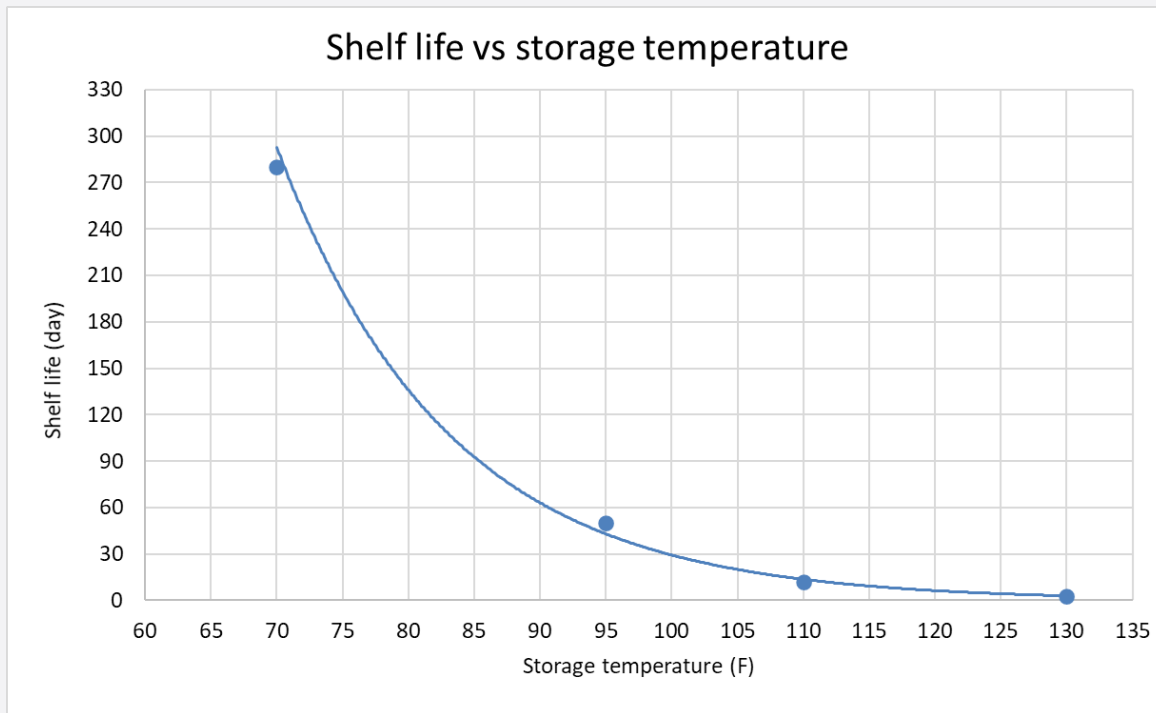


FIG 1

Figure 1 Shelf life of “27”, “14”, and “10” series flexible heater substrate products at different storage temperature

Note: the definition of shelf life is based on the curing status and adhesion between silicone rubber/fiberglass. In real applications the definition of shelf life could vary due to different customers using the products in different ways.

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Remaining Shelf Life Calculation

As mentioned earlier, it is not entirely realistic to control a storage temperature at exactly 70°F. If a certain lot of product experiences different storage temperatures, its remaining shelf life can be calculated. An example is as follows:

- Storage temperature history
 - 3 days 95°F
 - 30 days at 80°F
 - 60 days at 70°F
- Shelf life loss
 - 3 days 95°F: $3/45=6.7\%$
 - 45 days is the shelf life at 95°F. This can be read in **Figure 1**
 - 30 days 80°F: $30/135=22.2\%$
 - 135 days is the shelf life at 80°F. This can be read in **Figure 1**
 - 60 days 70°F: $60/280=21.4\%$
 - 280 days is the shelf life at 70°F. This can be read in **Figure 1**
 - Total shelf life loss= $6.7\%+22.2\%+21.4\%=50.3\%$
- Remaining shelf life
 - Remaining shelf life = $100\%-50.3\%=49.7\%$
 - If the storage temperature is set at 70F at this point, remaining shelf life = $49.7\%*280=\underline{139 \text{ days}}$
 - 280 days is the shelf life at 70°F. This can be read in **Figure 1**

Disclaimer: The shelf life guidance provided herein is for informational use only and does not guarantee any material performance or create any warranties outside of the official product shelf life as defined in product datasheets and material certificates.