



**DeRoyal Industries, Inc.**

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## **PHENOLIC YELLOWING OF STERILE PRODUCTS IN PLASTIC PACKAGES**

### **IF YOUR PRODUCT FROM DEROYAL APPEARS YELLOWED**

You may have noticed that the packaging on certain sterile products appears yellowed or discolored. This is not unusual and should not cause alarm.

### **WHAT CAUSES THIS DISCOLORATION?**

This phenomenon is referred to as “Phenolic Yellowing”. It is the most common type of textile yellowing, which is caused by the reaction of Nitrogen oxides (NOx) in an alkaline medium, with the phenolic compounds present on the textile materials. In fact, the alkaline condition that is required for the reaction between the phenolic compounds and oxides of nitrogen is inherent and expected in cotton textiles. The reason Phenolic Yellowing is so common is that most fabrics are processed predominantly in an alkaline medium.

Most of DeRoyal’s products are sterilized with Ethylene Oxide gas. Nitrogen is used as a purge gas during this process and the possible reaction of this nitrogen with other present gases and materials may result in nitrogen oxides, thus causing the discoloration.

The yellowing of the plastic will not significantly affect the physical properties of the plastic packaging nor will it negatively affect the product. However, if yellowing is noticed on a package, DeRoyal suggests inspecting the packaging seals prior to use to be cautious. Phenolic yellowing does **not** affect the expiration date of the product.

### **HOW CAN THIS DISCOLORATION BE PREVENTED?**

There are some preventative measures your facility can implement to minimize or retard the color change. These include: reducing storage time; protecting the finished product from exposure to carbon monoxide or nitrogen oxide gases (usually from propane powered lift trucks and heaters) and providing adequate ventilation in storage facilities.

DeRoyal’s suggestion would be to store products packed in plastic polymer packaging in dry, dark places with no direct contact with unbleached cardboard (if the storage exceeds six months). Again, however, there is no need to be concerned about the integrity of the product or its sterility.