



# DuPont™ Elvax® EVA copolymer resins

## Product Handling Guide

### THE IMPORTANCE OF PROPER HANDLING & STORAGE

Maintaining proper handling and storage conditions for DuPont™ Elvax® resins is very important to ensure overall product quality and keep the resin in a free-flowing state. If the Elvax® resin is subjected to sunlight, rain or excessive temperatures, then the resin may not process properly or achieve the desired characteristics in the final product.

It is crucial for Elvax® resins to be kept under proper storage and handling conditions because improper storage and handling may cause the resin to “block” (massing of pellets into large clumps that can hinder the ease of material transfer) or lose the ability to flow freely.

### HANDLING & STORAGE RECOMMENDATIONS

Elvax® resins are supplied in the form of small, free-flowing pellets. For long-term storage, the resin should be stored at a temperature between 50-75°F (10-24°C). The material should not be exposed to temperatures above or below this guideline. Material that has been exposed to temperatures above 90°F (32°C) or below 32°F (0°C) should be conditioned between 50-75°F (10-24°C) for a few days prior to handling. Elvax® resin should be stored in a closed environment, away from sunlight and rain.

When handling Elvax® resins, design the handling system to ensure resin flows freely. Elvax® should be handled between 50-75°F (10-24°C). The resin should not be exposed to extreme temperatures or excessive loads. Elevated temperatures can cause the resin to deform and affect the ability of the resin to flow freely. Temperatures below 50°F (10°C) may cause slower transfer rates in the resin handling system.

Avoid pellet degradation of Elvax® by ensuring the pneumatic conveying system has a gas velocity below 100 ft/s (30 m/s). Minimize the inventory time and static load by consuming material on a “first in, first out” basis. If possible, fill silos to the level needed for normal operations to reduce static load. Do not stack bags or boxes, if possible, to reduce static load.

Elvax® resins are resistant to attack by most aqueous acids and bases at ambient temperatures, but can be susceptible to attack by strong oxidizing acids at elevated temperatures. Elvax® resins should not be exposed to direct sunlight for long periods of time unless an ultraviolet stabilizer is used. Store and handle in a controlled manner, avoiding excessive temperature and the outside elements.

### WHAT IS “BLOCKING”?

When Elvax® resin is subjected to a large static load and excessive temperature, the pellets can elastically deform. The contact surface area between the pellets increases when pellets are deformed. The combined effect of the compressive forces and increased contact surface area prevent the pellets from sliding against each other, and an interlocked mass of pellets forms. This event is called “blocking.”

Blocking is a function of pressure, temperature and time. The viscoelastic properties of these resins allow the pellets to agglomerate under pressure from the weight of overlying material. The surface tackiness of the pellets causes blocky masses or “chunks” to form. Warmer temperatures reduce the viscosity or “soften” the pellets allowing greater contact surface area to form between the pellets. Storage of Elvax® resins in hot environments could increase the likelihood of blocking.

The product qualities of viscoelasticity and surface tackiness that make Elvax® valuable in many applications also contribute to the resins’ tendency to block. The DuPont™ Elvax® product portfolio includes grades with varying vinyl acetate content and a range of melt indices. The grades with high vinyl acetate content and high melt index have lower softening points and pellets that are more “tacky”. This tackiness prevents the pellets from sliding past each other and can increase the chance of blocking. Some Elvax® grades contain an anti-block additive which reduces the surface tackiness and keeps the pellets from sticking together.

Once the pellets are interlocked and blocked, freezing temperatures may exacerbate the issue. At colder temperatures, the pellets are more viscous and less likely to unblock in a reasonable amount of time once the compressive forces are removed.

Blocking is not a permanent fusing of the pellets. The masses can become free-flowing with time if the pressure from packaging and overburden are removed. If the pellets are melted and fused together, then it is likely the resin has been exposed to excessive temperatures. This specific scenario is not considered blocking; it is called melting and may be irreversible.

### WHAT TO DO IF ELVAX® “BLOCKS”?

Blocking should not be a problem if Elvax® is handled properly. However, if the resin does block, then there are a few things that can be done to resolve the issue.

First, inspect the resin to determine that the problem is due to blocking and not melting. If the pellets have melted and fused together, then it may be irreversible. Blocked Elvax® is generally reversible, and the resin can return to a free-flowing condition after the pressure from the static load and excessive temperatures are removed from the product for some time. The length of time needed for Elvax® to become free-flowing depends on the severity of the blocking.

**Bags/Boxes:** For blocked Elvax® resins in bags, unstack the bags from the pallet to relieve the static load. If the resin is blocked in stacked boxes, then unstack the boxes to reduce the compressive forces. If possible, place these boxes or bags in a temperature controlled environment that is between 60-75°F (16-24°C). Leave in ambient temperatures for enough time to allow the resin to become friable again. The time can be shortened by vibrating the bags or boxes or using gentle mechanical force to break up the massed pellets.

**Silos, Railcars or Hopper Trucks:** For blocked Elvax® in silos, railcars or hopper trucks, there are some ways to restore the resin to a free-flowing state. First, make sure that all transfer piping is cleaned and cleared of any restrictions. If possible, vibrate the resin to break up the massed pellets. If the bulk resin is in a very cold environment, then blowing warm air into the container has proven to work. In colder temperatures, Elvax® is more viscous and less elastic, so the warm air would help return the resin to a free-flowing state. Another option, if possible, is to remove the non-blocked resin on the top to reduce the static load on the blocked resin below.

When attempting to transfer the resin, make sure the air is free of contaminants and moisture. Air temperature should be between 50-75°F (10-24°C), but if the resin remains blocked then slightly increase the temperature until there is flow. Do not exceed 90°F (32°C).

If assistance is required at any time, call your DuPont customer service representative. If possible, provide the batch numbers, pictures of the problem, and samples.

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