

Product Information


 Surlyn® resins


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Safety in Handling and Use of Surlyn® Packaging Resins

General Comments

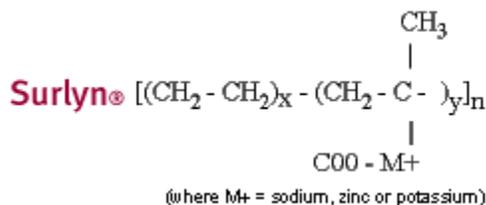
DuPont resins have a history of safe manufacture, processing, use and disposal. Nevertheless, molding, extrusion and other melt processing operations with any plastic material can expose personnel to potentially hazardous situations. Some are obvious, such as handling hot machine parts and contact with molten plastic. Others are not as obvious, such as exposure to fumes produced during melt processing operations and waste disposal by burning. This bulletin is provided as a guide but because of different processing operations it cannot be considered all-inclusive or absolute in all situations.

Description

Surlyn® resins are supplied in the form of small, free flowing pellets. They have narrow-to-broad molecular weight distributions and, depending on resin type, can be used in either extrusion or injection molding operations.

When processed, these resins will impart qualities such as good impact strength, optical properties, formability, solvent resistance, and adhesion to other materials along with a good balance of processing characteristics.

Chemical Formulation & General Properties



At ambient temperatures, Surlyn® resins are generally about as inert toxicologically as any man-made product. They are resistant to attack by most acids, bases and organic solvents at ambient temperatures, but can be attacked by strong oxidizing acids at elevated temperatures. Surlyn® resins should not be exposed to direct sunlight for long periods of time (unless a UV stabilizer is used) because of degradation that results from ultraviolet rays.

Processing

The recommended maximum processing temperature for Surlyn® resin is 325°C (617°F).

Under normal process temperature and throughput conditions, the amount of decomposition of this resin is minimal. However, significant resin decomposition can occur at abnormally high temperature or in situations where the resin remains molten for excessive periods, either within process equipment or in pools, such as those occasioned at start-up or shutdown, and in similar situations.

Depending on time/temperature conditions, the fumes evolved during thermal degradation of resins may contain:

- Methacrylic acid, used in the resin's manufacture, is considered to be toxic and has a pronounced odor.
- Pyrolysis products consisting of low molecular weight hydrocarbons.

- Oxidation products, such as carbon monoxide and acrolein which are believed to have the greatest toxicity potential.

NOTE:

Resins of Surlyn® contain low levels of methacrylic acid that will volatilize from hot resin. The methacrylic acid is not a product of decomposition but its presence arises from residual monomer which remains in the polymer.

Ventilation hoods are recommended to prevent fumes from being discharged into and accumulating in the work area. Proper hood design is important to ensure collection and disposal of these by-products. Hood design and calculation of minimal functional air velocity is best performed by knowledgeable design engineers.

Visual observation or odor detection should not be relied upon to determine the effectiveness of ventilation. While worker discomfort from odors is usually a sign that ventilation problems exist, it should be noted that the exposure limit for acrolein is below the concentration at which its odor generally can be detected.

Toxic fumes also can occur in post-processing operations. Therefore, it is important that adequate ventilation and proper operating conditions be provided and periodically checked to ensure that no hazardous fumes are present in the work area.

In the event of a fire, personnel entering the area should use a fresh air supply. Any type of extinguisher including water, dry chemical, carbon dioxide, or foam can be used to fight fires involving Surlyn® resins.

Unusual Fire, Explosion Hazards

An electrostatic charge potentially can build up when pouring powder or pellets. Grounding of all equipment is recommended, especially when blending Surlyn® resins with volatile combustible substances.

Flammability

During normal processing, storage and use, Surlyn® resins do not present a significant flammability hazard; but like nearly all organic materials, they will burn under suitable conditions.

Combustion and Pyrolysis

Thermal decomposition of resins produces fumes that can be potentially hazardous. Decomposition is a function of both processing temperature and time at that temperature. It should be noted further that some decomposition can occur below the recommended processing temperature limits for all resins.

Toxicity

Various functionalized polyolefins, in film form, have been used for more than 25 years in industrial applications and food packaging. Most grades of Surlyn® comply with the Food and Drug Administration regulation 21 CFR 177.1330 for use in food contact subject to the extraction provisions of the regulation on the finished food contact article.

Thermal Burns

Precautions for working around resin processing equipment should be obtained from the vendors of these machines.

If contact with molten polymer is made, immediately flush the burned areas of the skin with cold running water or treat with ice packs. Continue the treatment for 15 minutes or until the pain has diminished. Do not attempt removal of the hardened polymer. Obtain immediate medical attention.

Advice to the treating physician from the Haskell Laboratory for Toxicology and Industrial Medicine is as follows: Removal of hardened polymer from the skin generally is not advised as the polymer will eventually slough from the skin surfaces. Application of silver sulphadiazine cream at the margins of hardened polymer may reduce the likelihood of subsequent infection. Wrap affected area with sterile gauze and monitor daily for signs of possible complications.

Spills

Spills of any process material are a safety hazard. Spilled resin pellets can be very slippery underfoot and should be swept up immediately and disposed of properly.

Scrap Disposal

Disposal of scrap Surlyn® resin presents no special problems. Because it is an inert material, the preferred method is burial in a properly operated landfill. However, any disposal procedure must comply with all local, state, and federal regulations.

Incineration is the alternate disposal procedure. Under good combustion conditions, such as found in forced draft incinerators, Surlyn® resin is converted to carbon dioxide, water and trace components.

As with any combustible material incomplete combustion of Surlyn® resin results in the generation of volatiles which may be toxic. Carbon monoxide and low molecular weight aldehydes are believed to be the most hazardous fume components produced by incomplete combustion. For this reason, combustion of waste product is not recommended unless the oxygen supply can be maintained in amounts adequate for full combustion. Smoke produced under limited oxygen supply conditions should be considered toxic and should not be inhaled, as is also true for smoke produced from wood, paper or other materials burned under similar poor combustion conditions.

CAUTION:

Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "[DuPont Medical Caution Statement](#)", H-50102.

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