



DYLARK® Resins

Storage and Handling
Safety Guide

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INTRODUCTION	3
APPLICATIONS	4
HAZARDS and PRECAUTIONS	5
o Fire Precautions	5
o Health Hazards	5
o Dust Hazards	6
o Slipping Hazards	6
RECEIPT, TRANSPORTATION and HANDLING	7
o Railcar Handling	7
o Railcar Sampling Procedures	8
o Sampling from Bottom Valves	8
o Sampling from Top Hatch	8
SPILL CLEAN-UP	9
RECYCLING and DISPOSAL	9
INTERNET RESOURCES/LINKS	10

INTRODUCTION

NOVA Chemicals' DYLARK Engineering and DYLARK FG food packaging resins consist of solid, black, natural, opaque or transparent, .250 - .375 cylindrical pellets (primarily styrene and maleic anhydride copolymer) used typically for injection molding. DYLARK typically is produced in a variety of different grades under the three categories; crystal, impact modified and glass reinforced.

NOVA Chemicals Inc. (NOVA Chemicals) manufactures DYLARK engineering and FG resins at its North American facility located in Monaca, Pennsylvania. This manufacturing facility is certified under the International Organization for Standardization (ISO) 9002 quality standard and TS 16949. Supporting the manufacturing and sales of our products is our technology center at Beaver Valley, which also hosts a pilot demonstration plant. NOVA Chemicals has sales offices located throughout the world.

As a Responsible Care[®] company, NOVA Chemicals works to ensure the safest possible management of its chemical products throughout their life cycle from planning of new products through their manufacture, distribution, use and ultimate disposal. In support of our Responsible Care[®] commitment, NOVA Chemicals has compiled this document as a general guide to help our customers safely handle, store and process our DYLARK resin. The information provided in this Guide is believed to be accurate as of the publication date of this Guide.

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This Guide is intended for use in conjunction with NOVA Chemicals' Material Safety Data Sheet (MSDS) for DYLARK. Essential information relating to the safe handling, transporting, storing, and use of DYLARK is detailed in the MSDS. It is important to note that government legislation/regulations and industry standards/codes for building, fire protection/prevention, environment, health and safety, processing, use and transporting of products such as DYLARK must always be observed. Certain required regulatory information is summarized on the MSDS. For an up-to-date MSDS, please contact NOVA Chemicals at 1-412-490-4063 or via e-mail at msdsemail@novachem.com.

This document is intended as a general guide to processing DYLARK resins. For further details or assistance with DYLARK engineering resin, please contact the Technical Service Department at 1-248-364-4100 or 1-800-233-6461 and/or refer to the Best Design Manual which provides practical, hands-on advice for the optimal use of DYLARK resins in automotive applications. A copy of the Best Design Manual can be obtained by contacting the Technical Service Department or can be viewed on the www.dylark.com website. For further details or assistance with DYLARK FG food packaging resin, please contact 1-856-468-6298.

APPLICATIONS

NOVA Chemicals' DYLARK engineering resin gives our customers the ability to develop innovative products, providing industry leading adhesion performance, excellent stiffness and dimensional stability, outstanding long-term properties, chemical resistance, excellent processing, and economy. Customers mold our DYLARK engineering resin into a wide variety of automotive parts items:

- Instrument Panel Carrier
- Thinwall Instrument Panel / Duct Applications
- Structural Center Stacks
- Floor Console Applications
- Overhead Console Applications
- Defroster Panels
- Door Module Applications
- Audio Components Applications

NOVA Chemicals' DYLARK FG food packaging resin are FDA approved high-heat styrenic copolymers designed specifically for microwavable food packaging applications. DYLARK FG resins provides superior low temperature toughness, thermal stability and environmental-stress-crack resistance (ESCR) performance required for freezer-to-microwave performance. Customers mold and extrude our DYLARK FG resin into a variety of items:

- Take-out / Carry-out Containers
- Home Meal Replacement Packaging
- Retail Food Packaging

Approval by NOVA Chemicals of any application for DYLARK resin is neither intended nor implied by the contents of this Guide.

HAZARDS and PRECAUTIONS

Helping our customers safely handle, store and process DYLARK is a primary concern of NOVA Chemicals. This Guide contains important information about the safe and proper use of DYLARK resins. Please read, understand and follow these guidelines and those detailed in the applicable DYLARK material safety data sheet.

Fire Precautions

In general DYLARK is not considered flammable according to OSHA, but will burn upon prolonged exposure to flame or high temperatures. The principal safety hazard associated with processing DYLARK is when heated to its decomposition limits DYLARK emits acrid smoke and irritating fumes.

All processing equipment / barrel controls should be maintained and monitored for good working order to prevent overheating of the resin. Smoking or any other open flames must be prohibited in all processing, storage and warehousing areas. When hazardous work such as welding must be done in operating areas, remove all combustible materials and perform work under close supervision with a dry chemical, CO₂ or water/foam fire extinguisher readily available. In the event of a large fire **DO NOT** use a water jet and avoid high pressure, direct water streams that may spread molten or burning resins.

Health Hazards

DYLARK resin and parts fabricated or processed exclusively from DYLARK resin (e.g., in the absence of mold release, lubricant, colorant, paint or any other additive) are not considered toxic solids, primary skin irritants or strong skin sensitizers. Extended exposure to DYLARK resin in laboratories and processing plants has not resulted in significant health problems.

Certain grades of DYLARK contain small quantities of carbon black (<0.35% by wt.) or residual styrene monomer (< 0.3% by wt.) which are classified by IARC as group 2B materials 'possibly carcinogenic to humans.'

Although NOVA Chemicals' DYLARK resin is considered to be non-toxic, appropriate safety precautions during the handling, manufacturing, processing, cutting, fabrication, finishing and recycling operations, with particular emphasis on housekeeping, is recommended.

DYLARK resin may be irritating to the eyes. DYLARK resin may cause irritation to the skin from repetitive handling. Skin contact with molten or heated DYLARK resin may cause severe thermal burns. Eyewash stations and safety showers should be near the work location.

DYLARK resin should not be eaten. Ingestion of DYLARK resin is similar to the hazards of ingestion of other inert solids of similar size and weight. Mechanical irritation and blockage of the digestive tract are possible.

DYLARK resin may cause irritation to the respiratory system. The American Conference of Government Industrial Hygienists (ACGIH) and/or the US Occupational Safety and Health Administration (OSHA) have set exposure limits for styrene maleic anhydride copolymer, styrene-butadiene copolymers, ethylene-methyl acrylate copolymer, fiberglass, styrene, calcium carbonate, and carbon black of which some may be components of specific DYLARK material grades. Refer to the appropriate material safety data sheet for applicable exposure limit and composition information.

Ensure adequate ventilation and use local exhaust, where possible, in confined or enclosed spaces. If user operations generate dusts, mists or fumes, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. If ventilation is not sufficient to effectively prevent buildup of vapor/mist/fume/dust, appropriate NIOSH respiratory protection or self-contained breathing apparatus (SCBA) appropriate for exposure potential should be used.

Wearing personal protective equipment (such as chemical goggles, impervious gloves, protective coveralls and long sleeves, and respirators) will reduce the likelihood of exposure.

Please refer to the most recent and applicable DYLARK resin MSDS for additional details on health precautions.

Dust Hazards

Airborne particulate matter (dust) can be generated during transporting, transferring, manufacturing, finishing (cutting, stamping, grinding and sawing) and recycling (grinding and compacting) operations. Dust may be irritating to the nose and eyes. NOVA Chemicals recommends engineering controls, including the use of adequate ventilation and local exhausts. A filter mask is recommended where continuous exposure is involved.

The particle size and concentration of dust that may be generated by DYLARK resin processing operations is influenced by a range of factors including equipment type, operating conditions, such as cutting or grinding rate. Fine dust particles may suspend in the air, form dust clouds and/or cause a dust explosion.

Good housekeeping should be employed throughout the work area to limit the build-up of dust. Where practical, the following should be enforced:

- Dust from cutting and grinding operations should be collected and removed.
- All ignition sources must be eliminated in areas where dust clouds might form.

Slipping Hazards

Any amount of DYLARK resin on a walking or working surface will pose a slipping hazard. Good housekeeping is essential to avoid accumulations of spilled DYLARK resin material. Personnel should be prevented from walking on spilled DYLARK resin.

RECEIPT, TRANSPORTATION and HANDLING

In general DYLARK is shipped via truck in cartons, bulk truck or railcar to the manufacturing facility. In storing DYLARK all equipment containing material should be grounded, and located in a cool /dry area of the plant. To maintain a safe storage environment and preserve product integrity, DYLARK products must be in rooms free from any sources of ignition and heat and should incorporate a lockable environment.

DYLARK resins are considered slight reactive to oxidizing agents, alkalis, and acids. Carcinogenic, teratogenic and mutagenic materials should be stored in a separate locked cabinet or room.

There are various guidelines for handling DYLARK resins in terms of gaylords, super-saks, bulk truck or railcar methods.

Railcar Handling

One of the leading contributors of contamination is the improper handling of railcars. Increased communications and awareness regarding the proper unloading procedures can reduce or eliminate contamination problems. NOVA Chemicals' railcars undergo mechanical, safety appliance and interior and exterior liner inspections prior to loading and shipment.

Railcar coating (from the exterior to interior wall) typically consists of an exterior sidewall, primer coat, white epoxy coat and interior blue epoxy enamel final coat. Railcars damaged in transit have the potential for interior lining damage. If this occurs, the lining material can be identified by its distinctive color (typically blue).

Railcars travel through varying, and sometimes extreme, climate conditions and may breathe when pressure, altitude and temperature changes occur. Wet DYLARK resin may result from the humidity buildup in the car. This is a temporary problem and processing can begin once the resin is completely dry. Please contact the Technical Service Department for proper drying techniques.

Before unloading, the railcar should be inspected for any damage sustained during transit. In addition, the handbrake should be applied, the wheels chocked and grounded against static discharge. Ensure that the railcar is properly grounded – the wheels on the railcar do not provide adequate grounding. Plastics are typically excellent insulators; therefore, large static charges can build up.

When unloading the resin at least one hatch cover per compartment must be open. Railcars are not designed to withstand vacuum pressure. Failure to open at least one hatch cover per compartment can cause the railcar to implode. The top hatch and outlet should be fitted with a weather-resistant filter assembly. The filter prevents insects, dust or dirt from being pulled into the resin. A filter should also be placed over the opposite end of the valve tube not attached to the unloading hose.

To unload the railcar, open side valve slightly - increase valve opening throughout the process. Valve should be fully open when unloading is complete. Various hoses can be used for unloading including stainless steel, aluminum or plastic. The hoses must not be in contact with the ground during unloading. All hoses should be capped when not in use to prevent contamination from foreign matter.

It is recommended to keep air velocities below 5,500 ft./min. Use lower air velocities in extreme hot and cold temperatures. Lower air velocity will avoid creation of resin forms such as snakeskins, angel hair, lumps or excessive fines.

Use appropriate gauges and controls to maintain suitable conveying conditions and relatively high concentrations of resin in the conveying system. When compartments are empty, shut off the conveying system and close the open hatch. Once the railcar is empty, close and lock both outlet caps in place. **IMPORTANT:** Shut off the conveying system before closing hatches to avoid railcar implosion.

Avoid probing or hammering the railcar with metal instruments to dislodge resin during unloading. Railcar liners are not designed to withstand pounding from hard metal instruments. Vigorous probing or hammering can cause resin contamination through liner flaking. If required, soft rubber hammers or probes fitted with appropriate tips should be used to remove slow moving DYLARK resin.

Railcar Sampling Procedures

Sampling from Bottom Valves

1. Cut seal, remove caps and plastic seal
2. Wipe valve outlet with clean cloth
3. Black pellets, if found, should be cleaned from tubes and purged from the sample
4. Blow outlet valve and clean with filtered air
5. Place sample in clean container
6. Visually Inspect resin for contamination
7. Close sample container and outlet valve
8. Replace shield and valve caps if railcar is not loaded immediately, unloaded or left unattended

Sampling from Top Hatch

1. Clean area surrounding top hatch cover
2. Open hatch cover while keeping compartment dry and free from dirt and water
3. Withdraw sample using a sampling device. Device should be grounded to railcar
4. Place sample in clean container
5. Visually Inspect resin for contamination
6. Close, latch and seal if railcar will be left unattended before unloading begins

SPILL CLEAN-UP

Spilled DYLARK resin may create a dangerous slipping hazard and should be cleaned up immediately. Good housekeeping is essential to avoid accumulations of spilled DYLARK material.

Appropriate protective equipment and clothing should be worn during cleanup. Individuals without appropriate protective equipment should be excluded from area of spill until cleanup has been completed.

Stop the leak and contain the spill. Prevent the resin from entering sewers, drains, underground or confined spaces, and waterways. Use appropriate tools to put the spilled solid in an appropriate recovery or waste disposal container. Ensure that statutory and regulatory reporting requirements in the applicable jurisdiction are met.

RECYCLING and DISPOSAL

Preferred methods of waste management include the following:

- Clean and reuse, if possible
- Resin broker
- Plastics recycler
- Incinerate with waste heat recovery
- Landfill

Do not dispose of scrap or waste DYLARK by uncontrolled ignition (burning).

Grinding and/or compacting equipment for managing/recycling scrap and waste DYLARK should be properly bonded and grounded. Adequate ventilation should be provided in the grinding/compacting areas. Dust should be collected and removed. All ignition sources should be eliminated in areas where dust clouds may form.

All reuse, recycling, storing/staging, treating, transporting and disposal must be in accordance with applicable federal, state/provincial and local legislation/regulations.

DYLARK engineering resins can be reclaimed and recycled from rejected in-plant manufacturing instrument panels and trim offal. During this process, offal scrap is mechanically ground into a particle size, similar to that of normal plant regrind, which frees the DYLARK resin from the urethane foam and vinyl skin. This type of pre-consumer recycling has been done for over 10 years. Although salvage yards dismantle vehicles and recover approximately 75–80% of the metal and workable parts, an economical post-consumer recycling and recovery process of instrument panel resins is not yet available.

DYLARK FG resins can be recycled with polystyrene under Society of the Plastics Industry (SPI) code #6.

INTERNET RESOURCES / LINKS

The following Internet resources are provided for your convenience in obtaining additional information that may or may not be referenced in this Guide.

NOVA Chemicals

www.novachemicals.com
www.dylark.com

Trade Associations:

American Chemistry Council
Society of Plastics Engineers
Society of Automotive Engineers
Foodservice and Packaging Institute

www.americanchemistry.com
www.4spe.org
www.sae.org
www.fpi.org

U.S. Government/Regulatory Agencies:

Department of Transportation
Environmental Protection Agency
Occupational Safety and Health Administration
Food and Drug Administration

www.dot.gov
www.epa.gov
www.osha.gov
www.fda.gov

Industry Standards:

American Conference of Governmental Industrial Hygienists
American Society for Testing and Materials
American National Standards Institute
Factory Mutual
International Organization for Standardization (ISO)
National Fire Protection Association
National Institute for Occupational Safety and Health (NIOSH)

www.acgih.org
www.astm.org
www.ansi.org
www.fmglobal.com
www.iso.org
www.nfpa.org
www.cdc.gov/niosh



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