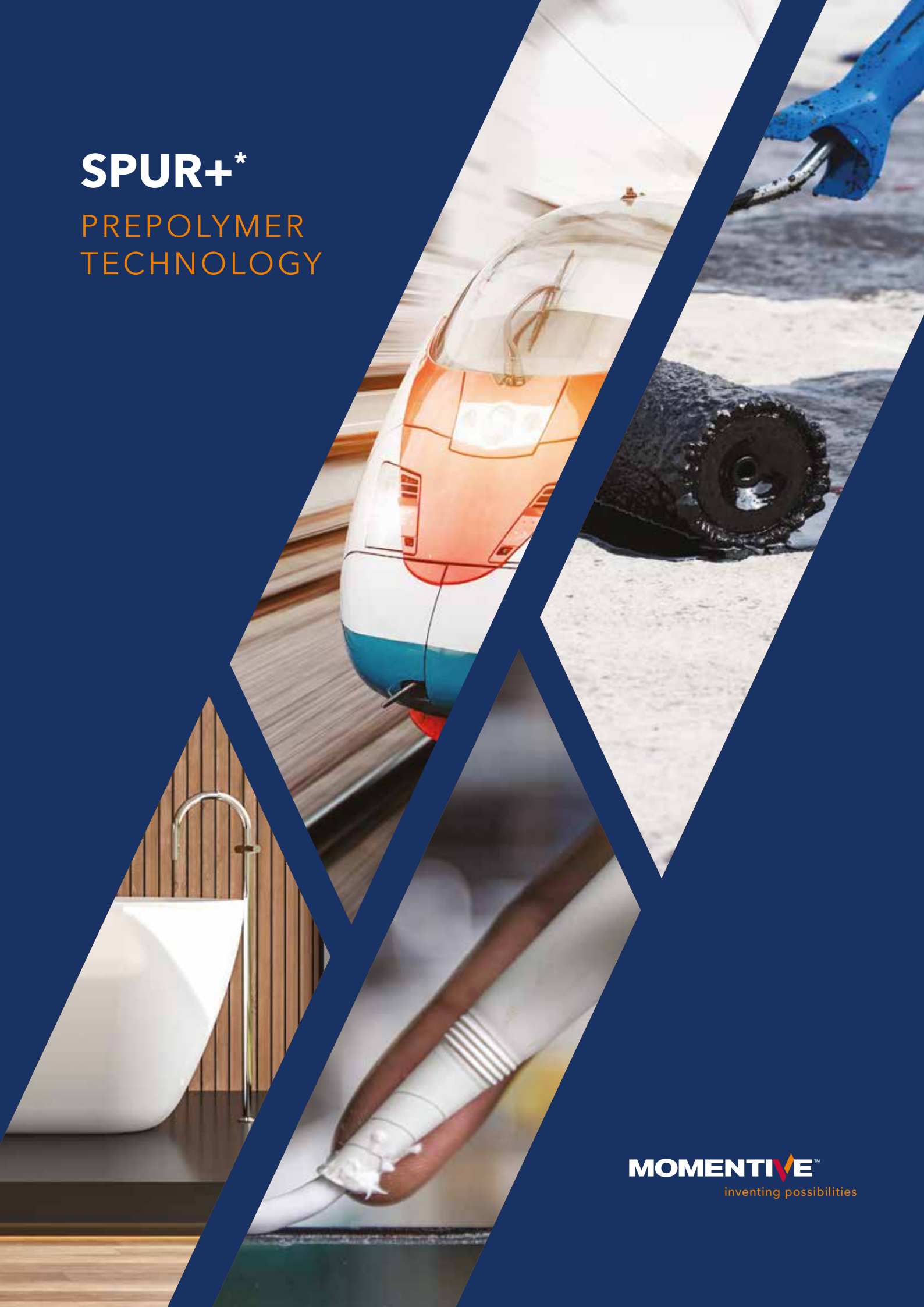
SPUR+*

PREPOLYMER TECHNOLOGY



MOMENTIVE™
inventing possibilities

A LEGACY OF INNOVATION

For more than 30 years, Momentive has served as a pioneer in the silylated polyurethane industry.

Our expert team of scientists are among the most experienced in the industry. They work closely with our partners to develop customized and differentiated products around the world.

Our SPUR+* prepolymer technology continues to deliver innovative solutions to the building and construction, transportation and roofing industries.

Our Global Resources Provide:

- Formulation and Regulatory Support
- Technology and Application Labs in Europe, Brazil, China, Japan, India and the United States
- Global Manufacturing Facilities For Consistency of Supply Worldwide

OVERVIEW OF CHEMISTRY

Silane terminated polyurethanes have become increasingly attractive to manufacturers of adhesives, sealants, and coatings This high-performance hybrid technology is the result of the synergy between the silane curing mechanism and polyurethane backbone properties. Sealant and adhesive formulations based on SPUR+ prepolymer offer fast room temperature cure and durability, as they are free from unreacted isocyanate. Benefits of the resulting products also include freedom from bubbling during a cure, and a broadening of the formulation latitude beyond that typically associated with most conventional polyurethane technologies.

*SPUR+ is a trademark of Momentive Performance Materials Inc.

In addition to these prepolymers, Momentive's broad-based portfolio offers additives and adhesion promoters such as Silquest* and CoatOSil* silanes.

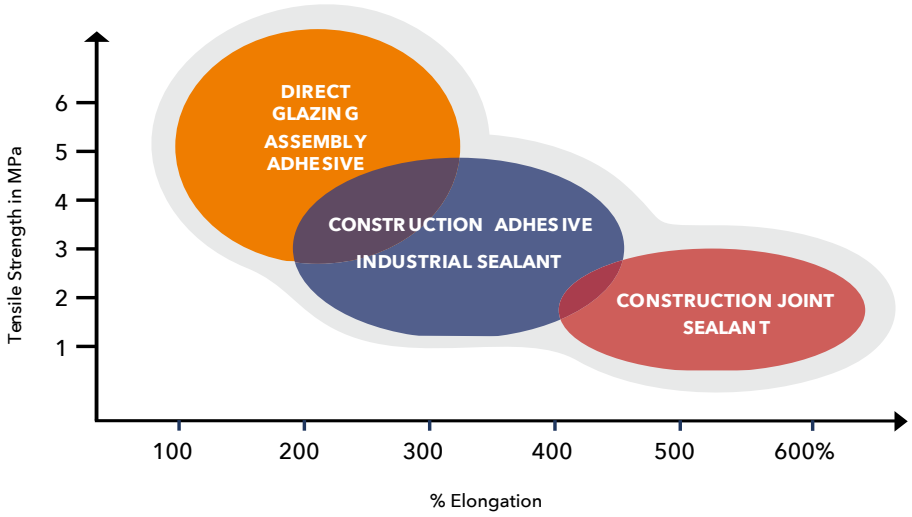
*Silquest and CoatOSil are trademarks of Momentive Performance Materials Inc.

UV STABILITY AND WEATHERABILITY WITH LOW DIRT PICK UP

CHOOSING THE RIGHT PREPOLYMER FOR THE JOB

Formulations developed using SPUR+* prepolymer offer a broadening of the formulation latitude compared to conventional polyurethane technologies. Silylated polyurethane technology has been successfully formulated into low, medium and high modulus sealants that offer a consistent balance of mechanical properties, along with application-oriented benefits such asimmediate paintability, advanced UV stability and weatherability, and outstanding adhesion performance.

Typical Properties of Adhesives & Sealants containing SPUR+



Typical properties are average data and are not to be used as or to develop specifications.

INDUSTRY APPLICATIONS IN THE FOLLOWING SPACES OFFER A VARIETY OF PRODUCT APPLICATIONS

Construction
Transportation
Wood Flooring
Roof Coating

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OUTSTANDING ADHESION PERFORMANCE WITH EXCELLENT ELONGATION

SPUR+* PREPOLYMERS TYPICAL PROPERTIES

Product	Typical Viscosity	Typical Characteristics	Construction	Transportation	Wood Flooring	Roof Coating
SPUR+1012 prepolymer	~50000	• Ultra Low modulus	●			
SPUR+ 1015 prepolymer	~50000	• Low modulus	●			
SPUR+1050 prepolymer	~35000	• Balanced mechanical properties	●	●	●	
SPUR+ 1060 prepolymer	~17000	• Medium modulus • Lower viscosity • Ethoxy prepolymer	●		●	
SPUR+ 3030 prepolymer	~2500	• Low viscosity • High hydrophobicity				●
SPUR+ 3040 prepolymer	~7000	• Low viscosity • High strength • Versatile • Easy to formulate		●		
SPUR+ 3060 prepolymer	~22500	• Balanced strength, flexibility and toughness		●		

Typical properties are average data and are not to be used as or to develop specifications.

Key Features and Typical Benefits

- Formulated without isocyanate
- Moisture cure at room temperature
- Primerless adhesion to many substrates
- Excellent chemical resistance and weatherability
- Excellent elongation and elastic recovery
- Broad formulation latitude
- Minimal shrinkage
- Formulation flexibility with 1K and 2K systems
- Easy application characteristics

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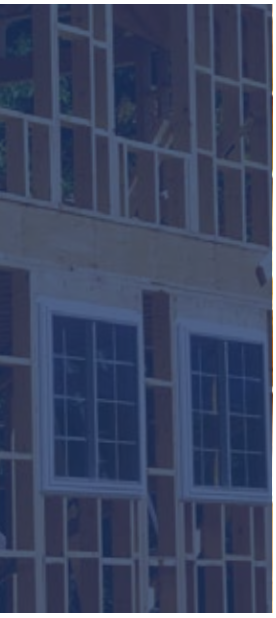

HIGH PERFORMANCE SILANES FOR SPUR+* PREPOLYMERS BASED SYSTEMS

Silanes	Primary Function	Primary Benefit	Suggested Applications
Silquest* A-Link* 235	Aminofunctional oligosiloxane	Adhesion promoter	Construction sealants where high elongation and elasticity are required Adhesion promoter to difficult substrates adhesion Improved co-catalytic effect
Silquest A-Link 600	Aminofunctional silane	Adhesion promoter	Aminosilane for clear sealants requiring low yellowing properties. High elongation Improved flexibility
CoatOSil* MP 200	Oligomeric epoxy silane	Adhesion promoter Crosslinker	Improved Adhesion & Hydrophibicity. Lower alcohol generation & volatility
CoatOSil T-Cure	Oligomeric mercapto silane	Adhesion promoter Crosslinker	Improved adhesion to glass and metal substrates Not for tin catalyzed Systems
Silquest Y-15866	Oligomeric vinyl silane	Moisture scavenger	Low/No HAPS Moisture Mitigation

*SPUR+, Silquest, A-link and CoatOSil are trademarks of Momentive Performance Materials Inc.

SPUR+* PREPOLYMERS GENERAL GUIDELINES FOR HANDLING, STORAGE & USE[1]

This document contains storage, handling, spill containment and sampling guidelines to help ensure the safe and environmentally responsible use of SPUR+ prepolymers resins by customers of Momentive Performance Materials, service providers (logistics), and any other related personnel.

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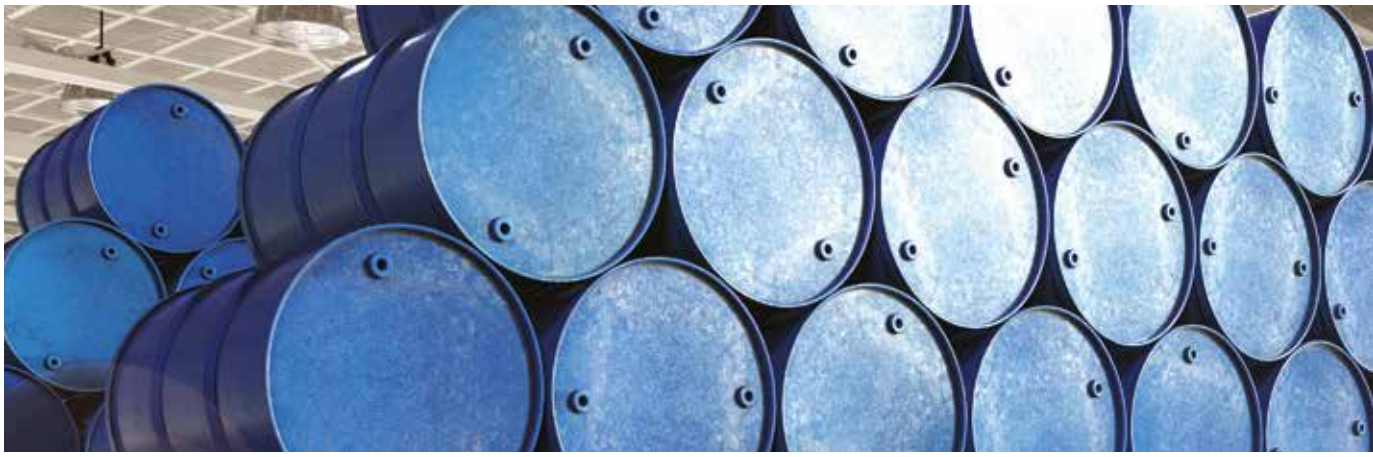


GENERAL GUIDELINES

- Keep away from sources of moisture and water, as any such exposure may result in the premature curing of the resin to a rubbery material.
- Always use clean and dry equipment for handling and storing SPUR+ prepolymers
- Avoid contact with skin and eyes, and use appropriate personal protective equipment, e.g. gloves, safety glasses, etc. (see SDS for details)
- Keep away from any source of ignition

STORAGE

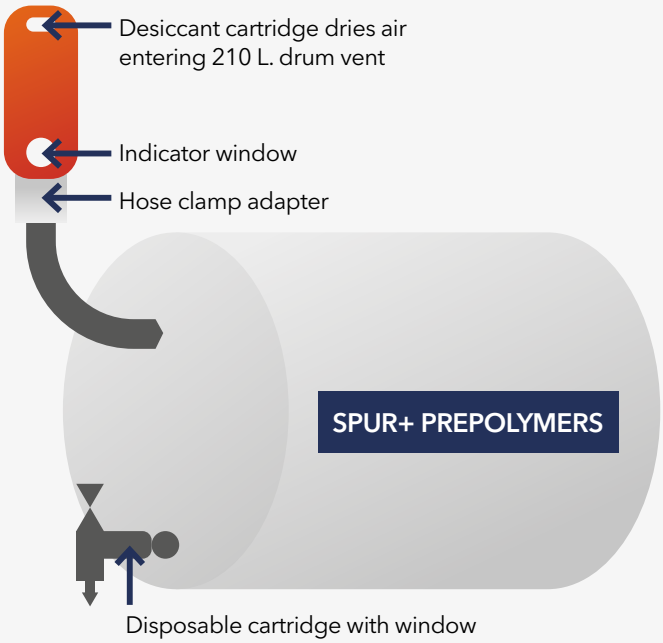
- Packaged resin must be stored in dry and cool storage area. Always store SPUR+ prepolymers in a covered warehouse with good drainage system (rain water free), at temperature not beyond the recommended level.
- Containers should be kept closed when not in use. Whenever possible, inert gas blanketing should be utilized to prevent exposure to moisture.
- Storage of partially expended containers of SPUR+ prepolymers is not recommended. If, however, such storage is anticipated, a dry gas atmosphere (e.g. nitrogen) should be applied to the headspace of the full container during discharge of the resin. A good seal should be applied to the partial container to maintain the dry headspace during storage.
- Proper storage is critical to the maintenance of the shelf life indicated on product packaging.

HANDLING

- Check drum(s) for sharp dents (may indicate break in liner) or leaking seams. The drums that store resins are typically baked epoxy-lined steel containers.
- Stainless steel, glass or TEFLON is recommended for any transferring equipment (like piping, valves, pump etc.) or any parts that come in direct contact with the SPUR+ prepolymers.
- Sampling equipment should be cleaned with ethanol or isopropanol and left to dry completely before use.
- Take every precaution to eliminate the possibility of sparks caused by static electricity, such as the use of explosion-proof equipment, an air pump, or appropriate grounding on the equipment and drum.
- Thread sealant, gasket material, pump lining, etc. should be made of non-reactive materials.
- Use of standard-type flexible hoses for the unloading of chemicals, e.g. those made from cross-linked polyethylene (XLPE), is acceptable.
- Do not over pressurize drums. Gravity pouring is appropriate for pails or small containers. For drums, IBCs and bulk containers, a discharge pump is recommended.
- Always minimize the possibility of moisture intrusion or contact. A desiccant vent or inert blanketing should be deployed whenever applicable.

1 Customers should review the latest Safety Data Sheet (SDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. SDS are available at www.momentive.com or, upon request, from any MPM representative. For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

DESICCANT VENT UNITS



Prevent condensatic water vapor which will contaminate organic liquid.

Cartridges contain the desiccant between felt filters in a metal can, which is punctured at each end when ready to use.

CLEANING

- Equipment used to handle SPUR+ prepolymers should be cleaned before being exposed to atmospheric moisture in order to prevent curing of residual resin in the equipment.
- Compatible solvents for cleaning equipment containing residual SPUR+ prepolymers includes methanol, ethanol, isopropanol, acetone, ethyl acetate and toluene.

PRODUCT SAFETY

- Consult product SDS for guidance on all safety topics, including:
  - Personal protective equipment
  - Ventilation
  - Special handling and/or health effects.

PROCEDURES Inert gas blanketing of pails, drums or IBC's

Inert and dry gas (e.g. nitrogen) should be used, however, the use of dry air is also acceptable. Special cylinder manifolds and pressure reducing and regulating stations may be needed. Gas pressure may need to be reduced using a regulator(s).

- A conservation vent or breather valve should be placed in vent line.
- Emergency relief valves are recommended. Important:

DO NOT OVERPRESSURIZE STORAGE CONTAINERS

NOTE: In some instances, nitrogen blanketing to minimize moisture exposure may not be practical or justified. In such cases, a desiccant chamber can be installed on the storage tank vent line to minimize moisture. Desiccant chambers can typically utilize solid desiccants, such as calcium sulfate, silica gel, activated alumina, or molecular sieves. Vent dryers are available from several sources.

HANDLING SPILLS

- Unrelated personnel must be evacuated from the spill site.
- All work involving open flame must be stopped immediately.
- All personnel involved in the spill containment must wear personal protective equipment (see SDS) before commencing procedure.
- Utilize a drip tray to contain any existing leakage (from drum or from equipment).
- Place approved absorbents onto the spill, mixing them into the spill if necessary. When absorbed, scrape solids into a disposal bin or tray and remove it to a well-ventilated and preferably remote area in order to avoid inhalation of volatiles by uninvolved personnel. The scraped drip tray can then be cleaned up with acetone or isopropyl alcohol.
- Leave absorbed residue exposed to atmosphere so that the moisture content in the air will continue to react in a slow and controlled way with the resin. Spread the residue out evenly to maximize exposure to the air. Leave exposed for at least 3 days.
- Have residue incinerated at a site approved to undertake such work.

PROCEDURES AND PRECAUTIONS FOR SAMPLING SPUR+ RESINS

- Stainless steel, glass or all suitable plastics (e.g. HDPE) is recommended for any sampling equipment (like piping, valves, pump etc.) and any parts that come in direct contact with resin.
- Sampling equipment should be cleaned and dried before use.
- Take every precaution to eliminate the possibility of sparks caused by static electricity, such as the use of explosion-proof equipment, an air pump, or appropriate grounding on the equipment and drum.
- Samples obtained should be contained in clean, dry bottles with reliable seals.
- A dry gas blanket should be used to protect the sample.
- Always attach the product SDS when transporting the samples.
- Always ensure that the samples transported and kept at a cool temperature and away from sun or moisture.

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