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**HI-TEC POLYMERS**  
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# Product Data Sheet

## CHEMFOAM<sup>®</sup> 21-121

### Rigid Polyurethane Buoyancy Foam System

#### Product Description

A general purpose, two-part, rigid polyurethane foam system, comprised of **CHEMFOAM<sup>®</sup> 21-121** polyol blend reacted with **CHEMIND ISO<sup>™</sup> 10-100** isocyanate.

#### Applications

This product is used as high performance buoyancy foam in leisure craft, pontoons and buoys. It is also used in general cavity filling and insulation applications.

#### Features

This product is an environmentally safe foam system, which does not contain any CFC compounds. It is a simple 100:100 by volume mix ratio system, and can be used without the need for specialised dispensing equipment. The system is suitable for processing through standard low and high pressure dispensing equipment, if required.

It exhibits an extended cream time, high yield and excellent flow properties, providing the applicator with sufficient working time to complete complex filling or moulding processes.

The cured foam has low density, uniform closed cell content, plus excellent compressive strength, dimensional stability and thermal resistance.

**CHEMFOAM<sup>®</sup> 21-121** system can be factory adjusted to meet special customer production or equipment requirements.

#### Quality Assurance

Each batch of **CHEMFOAM<sup>®</sup> 21-121** system is manufactured in accordance with company QA policy and should comply with the reactivity data shown below.

It is however, equally important that the user verifies such specification and uses the product with due care and with full regard to the product safety requirements.

#### Limitations

This product is not recommended for use in applications requiring materials rated under AS1530.3.

Although this product contains fire retardant, all polyurethane insulation will burn when exposed to fire. For interior building applications a protective thermal barrier equal in resistance to 13mm gypsum board should be used over the insulation.

This product is not recommended for applications where it will be subjected to foot traffic.

This product has a maximum recommended continuous service temperature of 85°C.

## Typical Reactivity Data

### Hand Mix Data @ 22°C Component Temperatures.

Mix Ratio (by volume) Polyol : Iso	100 : 100	
Mix Ratio (by weight) Polyol : Iso	100 : 109	
Cream Time	32±5	seconds
Gel Time	150±10	seconds
Rise Time	250±20	seconds
Free Rise Core Density	38±2	kg/m <sup>3</sup>

## Typical Foam Properties

In Place Density	42	kg/m <sup>3</sup>
Compressive Strength – parallel to rise	450	kPa
Compressive Strength – perpendicular to rise	400	kPa
Closed Cell Content (minimum)	90	%
Thermal Conductivity (Measured using LaserComp FOX 304, @ 25°C mean test temperature)	0.020	W/mK
Relative R-Value (@25mm foam thickness) (Measured using LaserComp FOX 304, @ 25°C mean test temperature)	1.25	m <sup>2</sup> K/W
Water Absorption (@23 °C)	0.50	kg/m <sup>2</sup>
Dimensional Stability		
- After 7 days @ 20°C, 50% RH	0±1	%
- After 7 days @ 80°C, 100% RH	0±5	%

## Application Instructions

This product is designed for application by the “hand-mix and pour” method, or by using conventional plural component processing equipment.

**CHEMFOAM® 21-121** polyol must be mixed thoroughly before each use, using a suitable drum mixer.

### Component Conditioning

The polyol and isocyanate components should be conditioned to a temperature of 20°C to 25°C prior to use. This can be accomplished by storing the materials in a temperature controlled room or by using drum heaters in cold weather.

### Hand mixing

Condition the Part A Polyol and Part B Isocyanate components to 20°C to 25°C.

Into a **clean, dry** mixing container, such as a polyethylene bucket or disposable container, weigh out the required amount of polyol and isocyanate.

Without delay, mix the components together using a high-speed electric drill fitted with an appropriate mixing impeller (i.e. a “Jiffy mixer”), for 20 seconds. Special attention must be given to ensuring thorough mixing is achieved, and that entrained air is minimised, if high quality foam is to result.

The mixed system must then be poured before material expansion (creaming) occurs.

### Equipment Operation

Equipment supplier’s instructions should be consulted for specific operation details.

Typically processing data follows:

- 1) Material heaters and hose heaters should be regulated at 20°C to 25°C.
- 2) Operating pressure = 200 to 1000 psi. (Machine & process dependent).

## Application Guidelines

### Substrate

The substrate should be clean, dry, free of oil, solvent or other contaminants prior to foam dispensing. Do not dispense foam in rain, snow, or fog, or under very cold or very high humidity conditions.

### Application Temperature

The **CHEMFOAM® 21-121** system can be dispensed on to substrates having temperatures between 20°C and 40°C.

## Application

The maximum amount of material that can be dispensed continuously in one "shot" is dependent on a number of factors, namely the maximum output of the machine and the size of shot required. In general, dispensing fresh system on top of already foaming system should be avoided, as the result can be poor quality foam.

A more suitable method of making large foam "pours" is to dispense system until foam rise is just apparent, then allow the foam to finish rising and become firm. Once firm, a second similarly sized shot can be made on top of the first. Repeat this procedure until the pour is complete. For the **CHEMFOAM® 21-121** system, a cycle time (from the end of one shot to the start of the next) of approximately 7 minutes should be adequate. To ensure excellent "interlaminar adhesion", avoid prolonging cycle times beyond twenty minutes.

## Clean Up

It is important to clean up any leakage or spillage of polyurethane as quickly as possible, before hardening occurs. Chemind GP Solvent, Xylene, MEK & Acetone are suitable for general cleaning. Use adequate safety equipment to prevent eye and skin contamination, such as safety glasses and impervious (butyl rubber) gloves.

Fully cured foam residue can be completely removed using Chemind NMP Cleaner. This material will dissolve the foam residue. However, it will also dissolve many other polymers it contacts such as neoprene and viton O-rings, fibre packing etc. This necessitates dismantling of the item to be cleaned and removal of any non-metal components before immersion in heated Chemfoam NMP Cleaner. Fluorocarbon polymers such as Teflon are impervious and can be immersed if required.

**Impervious gloves (butyl rubber) and safety goggles should be worn at all times when handling Chemind NMP Cleaner.**

A satisfactory method for heating and using the Chemind NMP Cleaner is to heat the cleaner in a stainless steel or porcelain coated, thermostatically controlled, "chip fryer". The thermostat should be set to a temperature of between 80°C and a maximum of 110°C. Immerse the component in the heated cleaner and allow it to soak for 10 minutes. Remove the component and wipe off any partially dissolved foam residue. Repeat the operation until the component is clean. Avoid scraping off softened residue, as damage to the component may result. Under no circumstances should any orifices in the component (i.e. impinger nozzles) be cleaned using a wire, as distortion of the orifice will result, affecting the future performance of the dispensing equipment.

## Storage

### Part A - Polyol Component (CHEMFOAM® 21-121)

This component should be stored under cover at temperatures ranging between 15°C and 25°C. As the polyol component is hygroscopic and will absorb atmospheric moisture, partially used drums should be tightly sealed when not in use.

Under these storage conditions this material will have a shelf life of approximately 6 months.

Storage temperatures of below 10°C and above 30°C should be avoided. Exposure to low temperatures can lead to crystallisation and phase separation of the material. The crystals can cause hose or machinery filter blockages, resulting in "off-ratio" foam production and slow curing foam. Extended exposure to high temperatures can cause degradation of the material resulting in processed foam that will not cure properly. Temperatures above 30°C can result in pressurised drums, which require care in opening.

Water contamination of this material must be avoided. Any water present on the drum rim must be wiped away completely before removing the drum bung. There are no hazards associated with water-contaminated polyol; however after machine processing with the isocyanate, the resulting foam can be very low in density, physical strength and dimensional stability. If a relatively high level of water contamination has occurred, soft uncured (or even semi-liquid) foam can result.

## Part B - Isocyanate Component (CHEMIND ISO™ 10-100 CRUDE MDI)

This component should be stored under cover at temperatures ranging between 15°C and 25°C.

Under these storage conditions, this material will have a shelf life of approximately 6 months.

Storage temperatures below 10°C and above 30°C should be avoided. Exposure to low temperatures can lead to crystallisation of the material. The crystals can cause hose or machinery filter blockages, resulting in “off-ratio” foam production. Exposure to high temperatures can cause partial polymerisation/dimerisation and thickening of the material.

As the isocyanate component will react with atmospheric moisture (forming solid particles which can interrupt dispensing equipment operation), partially used drums must be tightly sealed when not in use.

Water contamination of this material must be avoided. Any water present on the drum rim must be wiped away completely before removing the drum bung. This component will react with water to produce carbon dioxide gas. As a result, drums should be sealed from the atmosphere before, during and after use. Isocyanate drums suspected of being contaminated with water should not be sealed, as a potentially dangerous internal pressure build up can occur, leading to possible drum rupture.

## Handling Precautions

Refer to Material Safety Data Sheets for **CHEMFOAM® 21-121** and **CHEMIND ISO™ 10-100**.

**Operators must have full awareness of the Material Safety requirements before any work is undertaken.**

**CHEMFOAM® 21-121** polyol is a mild irritant. Avoid contact with skin or eyes. Provide ventilation or use in well-ventilated areas.

This material is hygroscopic and will absorb atmospheric moisture. Moisture contamination can result in the production of polyurethane foam that does not cure properly and remains soft or semi-liquid.

**CHEMIND ISO™ 10-100** isocyanate contains diphenylmethane-4,4'-diisocyanate (MDI). It is an irritant and allergic sensitiser of moderate toxicity. Avoid contact with skin or eyes. Avoid breathing vapour and use only in well-ventilated areas.

This component will react with water to produce carbon dioxide gas. Isocyanate drums suspected of being contaminated with water should not be sealed as an internal pressure build up may occur, which could lead to drum rupture.

**CHEMFOAM® 21-121** system processing must occur in areas with adequate ventilation. In confined spaces, suitable organic vapour respirators or air fed hoods must be worn.

Impervious gloves (butyl rubber), safety goggles or full-face shield, coveralls and chemical resistant safety boots should be worn when using this product.

## Theoretical Coverage

One kilogram of correctly processed **CHEMFOAM 21-121** system, in its unrestrained, fully expanded state (free rise) will occupy a 0.026m<sup>3</sup> volume. When estimating product requirements, allowances of 5% to 20% additional material should be made to account for processing losses, including component temperatures, substrate temperatures, over packing and flow restrictions.

## Packing

**CHEMFOAM® 21-121**

20kg & 230 Kg steel drums, 1100 Kg IBC

**CHEMIND ISO™ 10-100**

20kg & 250 Kg steel drums, 1200 Kg IBC

## Product Risk

The **CHEMFOAM® 21-121** system is not intended for use by other than experienced operators. The data herein requires experience and knowledge to attain correct interpretation and outcome. The user must undertake all relevant tests to determine the suitability for the intended application, as such determination of fitness of purpose for product use, is the sole responsibility of the purchaser.

Statements made in this bulletin are for the assistance of our customers. They are based on our experience and judgement but must not be regarded as amounting to a legal warranty or as involving any liability on our part.