Era
Polymers

A New Era in Polyurethane Chemistry

FOAMS

Introduction

Era Polymers is an Australian owned and operated Polyurethane Systems House. The company was founded in April 1986, in a home office, by George and Tina Papamanuel. Since those humble beginnings the company has grown to become the largest Polyurethane Systems House in Australia and South Asia.

Operated by Industrial Chemists, **Era Polymers** has built an enviable reputation for outstanding product quality customer and technical service. **Era Polymers** currently exports products and provides technical service to over 75 countries worldwide.

Era Polymers is headquartered in Sydney, Australia as is **Era Polymers'** R&D Centre which supports a team of development chemists, the NATA* accredited laboratories as well as an extensive array of testing equipment.

Also located in Sydney are two world class manufacturing sites - **Samos Ena** and **Samos Dio**.
At these sites, **Era Polymers** manufactures polyurethane systems for foams, elastomers, spray systems, binders, membranes and coatings.

Located in Melbourne, **Era Polymers** operates a third Australian manufacturing operation – **Applied Polymers**. This production site is responsible for the development and production of high performance foam insulation systems, in particular for the LNG (Liquefied Natural Gas) Industry.

For more information, please visit :

www.appliedpolymers.com.au

APPLIED POLYMERS

Era Polymers NZ Limited manufactures and distributes polyurethane foam systems to the New Zealand market from a production site centrally located in Auckland.

More information is available at **www.erapol.co.nz**

Era Polymers Africa, from a state-of-the-art production facility in Johannesburg, develops and manufactures polyurethane foams, elastomers, binders and spray systems for supply to South Africa and the African continent.

Please visit **www.erapol.co.za** for more information.

Era Polymers' focus on export markets has resulted in more than 75 countries being serviced and supplied with high quality polyurethane systems by **Era Polymers.** Partnerships in Europe, USA and Asia have enabled **Era Polymers** to bring the manufacturing of **Era Polymers**' products into these markets, decreasing response times and shortening delivery lead times, while ensuring that product quality is never compromised.

The range of polyurethane foam systems has raised the industry standard. These polyurethane systems are complimented with a complete range of ancillary products such as pigments and release agents.

In an increasingly impersonal world,

Era is dedicated to the principle:

"Business is People Doing Business With People"

* National Association of Testing Authorities

Table of Contents

Applications

Industry	Applications
Appliance	Water heaters, commercial and domestic refrigerators, chillers
Construction	Insulated panels (SIPS), ducting, sprayform, ground consolidation, underpinning, roller shutters
Film and Art	Movie props, carnival floats, decorative sets, medieval armour
Footwear	Work boots, sport shoes, shoe in-soles, midsoles, out-soles
Furniture	Domestic and office seating, frames, armrests, bedding
Leisure	Coolers, surfboards, windsurfers, wakeboards, snowboards, sporting goods, toys
Marine	Buoyancy foam, pontoons, submersibles, fish boxes
Medical	Nasal masks, viscoelastic seating / bedding
Oil, Gas & Mining	Pipe insulation, pipe supports, trench breakers, pipe pillow, drilling plug foam (mud foam), soil stabilisation / ground consolidation, pipe jointing, pipe pigs.
Transport	Insulated truck / trailer panels, bollards, crash barriers, steering wheels, dashboards, seating, roof linings, rear view mirrors, underlay, sound deadening, sun visors, jounce bumpers, filters, vandal proof seating, moulded cup holders, armrests.

Era Polymers' Foam Systems, Designed Specifically to your Application & Processing Requirements

Era Polymers' broad range of polyurethane products has opened new possibilities for the design and construction of buildings. Rigid polyurethane foams, including spray polyurethane foams, is one of the world's most energy efficient and versatile insulation and air sealing products.

What Are Polyurethane Foams?

Polyurethane foams are formed from the reaction of an Isocyanate (ISO) with a Polyol (POLY).

These two components combine to produce an exothermic reaction which results in the formation of polyurethane foam. The secret is in the additives contained in the ISO and POLY, which combine together to produce a blown foam with specified properties.

Polyurethane foams can be simply classified as **Rigid**, **Flexible** & **Semi Rigid, Integral Skin Foam** and **Microcellular Foam**.

Rigid Foams have excellent thermal insulation properties and are widely used as insulaton materials in domestic and commercial appliances such as refrigerators and hot water systems.

Flexible & Semi Flexible Foams are extremely comfortable so are used extensively in the automotive, bedding and furniture seating industries.

Integral Skin Foams are flexible or semi rigid foams comprising a cellular core with a tough integral skin that is hard wearing and abrasion resistant.

Microcellular Foam also known as **Elastomeric Foam** is a fine celled high density high performance flexible foam with excellent tensile and tear strengths.

the green foam

OZONE FRIENDLY ✓ CFC FREE ✓ HCFC FREE ✓

Era Polymers manufacturers 3 brands of foams; **Erathane** and "Green" Foams, **Greenlink** and **Ecofoam**, which are a full range of non-ODP (Ozone Depleting Potential) and zero GWP (Global Warming Potential) foams.

The **Erathane** Range includes foams blown with conventional blowing agents.

Greenlink Foams – Are water blown foams

Ecofoam – These foams use HFC, HFO or Hydrocarbon blowing agents.

Polyurethane Foams in construction form a part of our everyday lives. Foams also play a vital role in industries ranging from appliances to automotive. New polyurethane foams are constantly being developed allowing the market to constantly grow and diversify.

Foam Properties

Polyurethane foam is a large and very diverse section of the polyurethane world. In categorising the types of properties applicable, it is made more complex by the fact that the materials can be formulated to be rigid, flexible and microcellular.

The examples below highlight the diversity of properties.

1. Hardness

Era Polymers polyurethane foams offer a very wide range of hardness types from hard rigid foams to soft flexible foams. The flexible ranges from soft Shore A flexible foam (10 - 15A), which is softer than a gum eraser, to 55 - 60A elastomeric foams of a hardness similar to car tyre treads. While the hard rigid foams are other much stiffer and can be used for light weight structural parts.

2. Abrasion Resistance

In applications where severe wear is a problem, **Era Polymers** polyurethane foams offer outstanding durability when compared with other rubbery plastics, an example being the Greenlink foams used for shoe soles, which have outstanding abrasion resistance.

In many applications the unusual combination of properties has made it possible to design and fabricate products from **Era Polymers** polyurethane foams using less quantities of materials than has been possible with other elastomers. It should be emphasised that abrasion resistance is a complex property.

Selection of the correct polyurethane foam should be based on actual experience or simulated service tests.

3. Compression Properties

Rigid foams have excellent load-bearing weight capability compared to many other plastics or natural products such as wood. This property is a highly important factor in many designs, e.g. use in boats, building panels or other composite parts.

Flexible foams also have an excellent load-bearing weight capability but the emphasis is different; comfort is the key feature for a wide assortment of applications e.g. seating or bedding.

4. Resilience

Resilience in conventional rubbers is generally a function of hardness. This often undesirable relationship does not hold true with flexible foams. Formulations are available in a wide range of resilience.

For high shock absorbing uses, low rebound foams are usually used i.e. rebound value of 0 - 10%. For high frequency vibrations or where quick recovery is required, compounds in the 20 - 40% rebound value are used.

Spray Foam Facts

Spray Polyurethane Foam (SPF) is made by mixing and reacting unique liquid components to create foam. The liquids react very quickly when mixed, expanding on contact to create foam that insulates, seals gaps, and can form moisture and vapour barriers.

Each spray foam type and method of application offers unique benefits. There are three primary types of SPF that can be used for insulation and other specific purposes:

HIGH DENSITY - ***closed-cell foam.*** 48 kg/m^3. Often used for exterior and roofing applications

MEDIUM DENSITY - ***closed-cell foam***. 32 kg/m^3. Often used for continuous insulation, interior wall cavity fill, and unvented attic applications.

LOW DENSITY - ***open-cell foam.*** 8 kg/m3. Often used for interior wall cavity fill and unvented attic applications

Foam Properties

5. Flex Properties

Era Polymers flexible foams can be designed to resist cracking under repeated flexing. Unlike other elastomeric materials **Era Polymers** flexible foams can be utilised practically in thin sections because of their strength and toughness. This is a necessary property for polyurethane shoe sole systems.

6. Low Temperature Properties

Many **Era Polymers** flexible foams remain flexible at very low temperatures and possess outstanding resistance to thermal shock.

Era Polymers rigid foams can be designed to remain dimensionally stable at very low temperatures for use in low temperature insulation applications and offer excellent thermal insulation properties.

7. Dry Heat Resistance

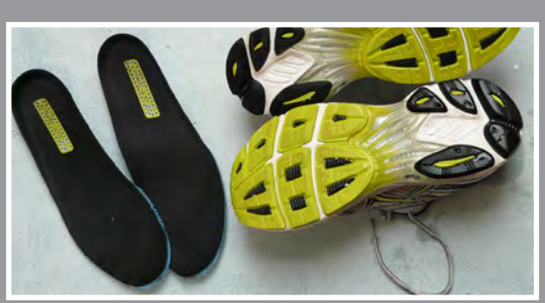
While many **Era Polymers** polyurethane foams are only suitable for continuous operation at ambient temperatures, intermittent use up to 120ºC is possible. With specially formulated rigid foam materials, continuous operation up to 120ºC may be achieved.

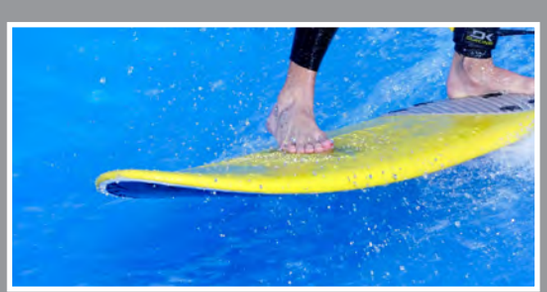
Advice on the most suitable material for any particular application should be sought from **Era Polymers'** Technical Service Department.

8. Water Resistance

Depending on the type, polyurethane rigid foams are very resistant to the swelling and deteriorating effects of water immersion and have excellent longterm stability in water up to 50 °C. Continuous use in direct contact with hot water over 80 °C is not recommended.

Water absorption is very low, in the range of 1 - 3% by weight. Volume swell is negligible for many rigid foams.





Foam Properties

9. Oxygen and Ozone Resistance

Products made from **Era Polymers** foam systems are highly resistant to degradation by atmospheric oxygen and ozone. Tests on samples, aged over 500 hours in an atmosphere containing 3ppm ozone, show no attack. Past experience has shown that materials which resist this concentration for several hundred hours are virtually immune to attack by normal atmospheric concentrations.

10. Oil, Grease and Chemical Resistance

While many rubbers and plastics have excellent resistance to one or more specific solvents, oils or chemicals, the wide resistance of some polyurethane foams to chemical attack means that they can be used in a multitude of environments. This makes them an excellent choice for shoe sole materials on industrial work boots used in the chemical and food industries.

As with all materials being examined for oil and chemical resistance, it is best to place a sample of the material in actual service. If this is not practical, tests should be devised which simulate actual service conditions as closely as possible.

11. Flame Resistance

Era Polymers polyurethane foams can also be formulated with special flame retardants to pass many self-extinguishing or flame spread specifications. Consult Era's Technical Service Department for information on systems to pass specific test requirements.

12. Mould, Mildew, Fungus Resistance

Suitably compounded **Era Polymers** polyurethane foams do not support fungus growth and are generally resistant to such attack. This makes them particularly suitable for tropical environments. Advice on the most suitable material should be discussed with our Technical Service Department.

Foam Properties

13. Bonding to other Materials

During the moulding process and under controlled conditions, **Era Polymers** polyurethane foam can be bonded to a wide variety of materials. Strong bonds can be obtained to substrates such as metals, wood and some plastics. Bond strengths often exceed the tear strength of the foam itself.

It is more difficult to bond cured polyurethane foam sheets or mouldings to other materials but special techniques have been developed to satisfy most requirements. We supply a complete range of bonding agents and primers to meet specific requirements.

14. Noise Reduction

A large part of the automotive industry is based on polyurethane foams for sound deadening and anti vibration applications. These foams, often called NVH (Noise Vibration and Harshness) foams, are part of the **Era Polymers** polyurethane foam range.

Polyurethane Foam in Automotive Applications

Polyurethanes are used extensively in cars to help reduce weight, increase fuel economy while providing comfort and safety, and provide excellent resistance to chemicals and weathering. An average, mid-size vehicle uses about 28 kg of polyurethane material.

In addition to the foam that makes car seats comfortable, bumpers, interior “headliner” ceiling sections and the car body, spoilers, doors and dashboards all use polyurethanes.

Foam Properties

The properties of polyurethane foams will change with formulation and processing conditions. The conditions will include the type of equipment, temperature of components, mould temperature and flow pattern of foam. Standardised test methods enable the formulator to check the reproducibility of the foam in production and determine the suitability of foam for an application.

Methods for Measuring Physical Properties of Rigid Cellular Polyurethanes

Physical Properties	Units	Method
Density determination	kg/m^3	ASTM D1622 AS 2282.3 AS 2282.4
Compressive stress @ 10% deformation	kPa	ASTM D 1621 AS 2498.3
Dimensional stability (width, length and thickness)	%	AS 2498.6
Determination of flexural properties	MPa	AS 2132
Closed cell content	%	ASTM D6226
Thermal Conductivity and K-value	W/mK	ASTM C 518
IZOD impact resistance	kJ/m^2	AS 1146.1
Tensile strength	kPa	ASTM D1623
Tumbling friability of performed block-type thermal insulation	%	ASTM C 421

Methods for Measuring Physical Properties of Flexible Cellular Polyurethanes

Physical Properties	Units	Method
Tensile Strength	kPa	AS2282.6
Elongation at break	%	AS2282.6
Determination of tear strength	N/m	AS2282.7
Compression Set	%	AS2282.9
Determination of resilience	%	AS2282.11
Density determination	kg/m^3	AS2282.3 AS2282.4
Force deflection (Method B)	N	AS2282.8

Foam Processing

1. Storage

The components should be stored in sealed drums at storage temperatures of 18-25°C out of direct sunlight. **Isocyanate** - to preserve the integrity of the isocyanate content so that the NCO does not decrease, do not expose the isocyanate to moisture or heat (unless otherwise specified as part of the processing conditions for the product). Isocyanate reacting with water will cause an exothermic reaction and will liberate gases such as carbon dioxide, resulting in an expansion of the drum.

Polyol - this component may contain a low boiling point solvent. At elevated temperatures, pressure will build up in the drums. When opening the drums, exercise care in releasing the internal pressure slowly.

2. Toxicity

Before handling the isocyanate or polyol components, consult the Safety Data Sheet (SDS). Contact with skin or eyes must be avoided. Safety goggles and protective gloves should be worn when handling both of these chemicals.

3. General Processing

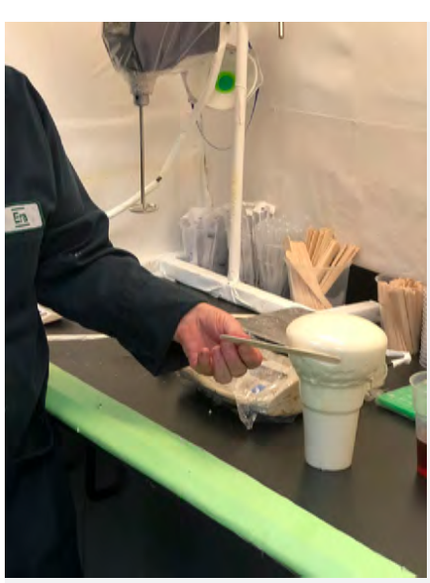
Machine Mixing

Era Polymers foam systems can be machine dispensed by low or high-pressure polyurethane dispensing equipment. Some are also suitable for hand mixing. Please contact one of **Era Polymers** equipment specialists for a comprehensive assessment and dispensing equipment recommendations.

Hand Mix Procedure

There are a number of ways to successfully produce polyurethane foam. The processing method will contribute to the final finish.

In void / cavity filling applications pressure will be created, therefore consideration of the mould material and reinforcement needs to be taken into account. The hand mixing process will be explained in the following section, with emphasis placed on the mixing.



List of Equipment Required

- Drill / electric mixer. Drill should be capable of reaching at least 2,500 rpm. **Note:** The mixer size and power is related to the amount of system one intends to mix at a time. Consult one of Era Polymers' foam specialists for recommendations.
- High speed paint type mixer / stirrer
- Container
- Scales (preferably digital)

Mixing Procedure

- Pre-condition the system to the desired working temperatures. Note: Decreasing the temperatures to less than 15°C, will slow the reaction rate and reduce the foam's final yield. Elevated temperatures will speed up the foaming reaction to a point where it may seem to be out of control. Care must be taken.
- Weigh out the correct amount of Polyol into a dry clean mixing container.
- Follow with the correct amount of Isocyanate.
- Thoroughly mix the components for the recommended mixing time.
- Pour the mixed material into a prepared mould / cavity.

Foam Processing

4. Foam Processing Guidelines

Maintaining the correct mix ratio of polyol to isocyanate is vital in producing reproducible parts of good quality.

- **Hand mixing** - the speed of the drill to reach at least 2,500rpm.
- **Slow mixing** - speed will result in slower rise, unfilled mould and coarse cell structure.
- **Weighing** – Polyol and Isocyanate must be weighed accurately as per the specified mix ratio using calibrated scales.
- **Mixing time** - The polyol & isocyanate must be mixed before the cream time begins.
- **Containers** - The containers are to be clean and dry before pouring liquid polyurethane into them.

Temperature

Polyol & Isocyanate - If chemical temperatures are too high, the reaction profile of the foam is faster.

If the temperature for the components is too low, the reaction profile is slower.

- **Moulds** – In most cases a mould temperature of 30-50°C is preferable. The polyurethane reaction is exothermic and a cold mould or substrate will act as a heat sink and the foam will not expand as much.
- Demould time can be related to a number of factors, including mould & ambient temperature, size, reaction / cure time.

Pre-treatment of polyol component

The polyol component should be mechanically mixed prior to use.

The polyol component is a blend of polyols, catalysts, blowing agents, surfactants, pigments and other additives which will settle / separate over time. Therefore it is good practice to mechanically stir the material to ensure a homogenous blend.

Batch Size

A larger batch of mixed material will react faster than a smaller batch. Consider this when hand processing the foam. If too large a batch is mixed, the stirrer may not produce sufficient mixing or quality mixing which will enable the fine cell structure to form in the foam.

Post- Cure

Generally foams will be 80-90% cured within 24hours and full physical properties will typically be attained within 3 days.

Moulding

New moulds - Fabricated from metal, plastics, fiberglass and timber. Any porous surface should be sealed first. A mould release e.g. a wax based release agent should be used before each moulding. Conditioning of a new mould will require at least 2-3 coats of release agent, applied one after another, with sufficient time between each coat to allow for solvent evaporation. The preference for foams is a wax based release agent.

- **Venting** – Foams will generate pressure inside a mould. Incorporate a few small vent holes or fillets in the mould in any areas where air is becoming trapped. This will allow the air and/or gas to escape. Only allow a minimal amount of material to escape. If too much material escapes through vent holes or through the side of the mould, this may result in voids forming inside the mould.
- **Positioning of mould** – Angle the mould so the vents are at the highest point.

Release Agent

- Incorrect type or excessive amounts of release agent can cause voids or other surface defects.
- Periodically clean the wax from the mould as part of general maintenance.

Foam Overpack

The mass of material needed to pack the mould will need to be calculated. Several elements will need to be taken into account:

- Type of Foam
- Foam Density
- Mould & Component Temperature
- Volume of Mould being filled

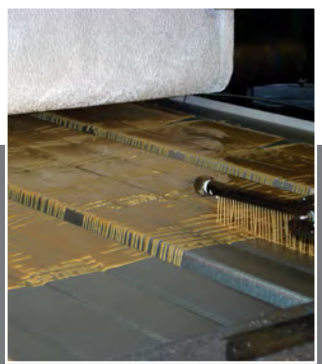
Types of Polyurethane Foams

RIGID: General Purpose Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
Various mix ratio by weight	High Density 32kg/m³ to 300kg/m³	✓ For Pour-In-Place Applications	* High or Low Pressure Equipment

Applications

- INSULATION
- BUOYANCY
- STRUCTURAL SUPPORT
- VOID FILLING



RIGID: High Density Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
Various mix ratio by weight	Free Rise Density 150kg/m³ to 900kg/m³	✓	* High or Low Pressure Equipment

Applications

- MEDICAL EQUIPMENT / CABINETS
- IMITATION WOOD
- PIPE SUPPORTS
- FISHING LURES
- STRUCTURAL PARTS

RIGID: Appliance Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
100/100 - 150 (P/I) by weight	28kg/m³ to 70kg/m³	✓	* High or Low Pressure Equipment

Applications

- WATER HEATERS
- DOMESTIC & COMMERICAL REFRIGERATION
- BEER CHILLERS

Types of Polyurethane Foams

RIGID: Block Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
100/100-200 (PI) by weight	32kg/m³ to 150kg/m³	✓	* High or Low Pressure Equipment

Applications

- INSULATED PANELS - PIR / PUR
- BUOYANCY
- SIGN BOARDS
- PIPE INSULATION
- THREE DIMENSIONAL SHAPES

RIGID: Spray Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
1:1 by volume	High Density 8kg/m³ to 150kg/m³		* High Pressure Plural Component

Applications

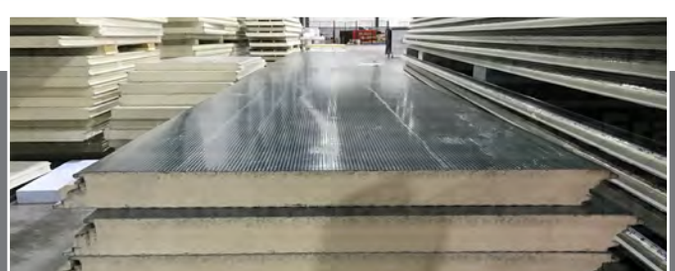
- BUILDING
- INSULATION SHIPPING
- CONTAINERS
- REFRIGERATED / COLD STORES
- ROOF / WALL / UNDERFLOOR
- TANK
- DUCTING

RIGID: Panel Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
Various mix ratios by weight	Free Rise Density 28kg/m³ to 80kg/m³		* Low / High Pressure Component Pressure Equipment

Applications

- POLYISOCYANURATE OR POLYURETHANE CONTINUOUS / DISCONTINUOUS INSULATED PANELS (SIPS) FOR THE CONSTRUCTION INDUSTRY, INSULATED TRUCK BODIES, CARAVANS



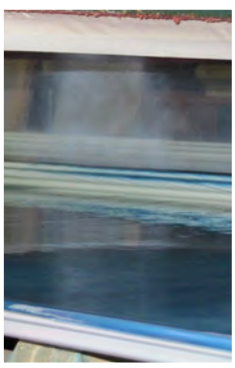
Types of Polyurethane Foams

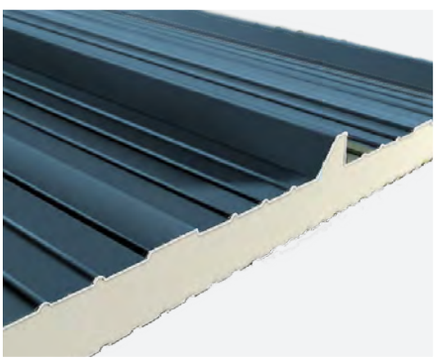
RIGID: Panel Foam Adhesive System

Ratio	Densities	Hand Mixed	Machine Processed
100:170-180	Free Rise Density 37kg/m³ to 130kg/m³		* Low Pressure Plural Component Equipment (Drip & Smear Application)

Applications

- USED AS AN ADHESIVE FOR BONDING EXPANDED POLYSTYRENE (EPS) / PIR / PUR FOAMS TO VARIOUS SUBSTRATES FOR USE IN THE INSULATED PANEL MARKET





FLEXIBLE: ISF (Integral Skin Foam)

Ratio	Densities	Hand Mixed	Machine Processed
100:30-50 (P/I) by weight	Free Rise Density 120kg/m³ to 300kg/m³	✓	* High or Low Plural Component Dispensing Equipment

Applications

- BICYCLE SEATS
- ARM RESTS
- HEAD RESTS
- BUMP STOPS
- STEERING WHEELS

FLEXIBLE: Elastomeric (Microcellular) Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
Various mix ratio by weight	Free Rise Density 150kg/m³ to 500kg/m³	✓	* Low Pressure Equipment

Applications

- BUMP STOPS
- JOUNCE BUMPERS
- SHOCK ABSORBERS
- PIPELINE PIGS

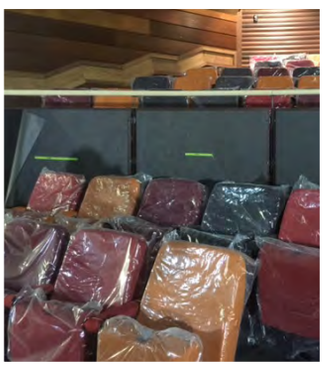
Types of Polyurethane Foams

FLEXIBLE: High Resilience Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
Various mix ratio by weight	Free Rise Density 50kg/m³ to 160kg/m³	✓	* Plural Component Equipment

Applications

- SEATING
- HEAD RESTS
- TAXIDERMY
- SOUND ABSORBING PRODUCTS



RIGID: Surfboard Foam Systems

Ratio	Densities	Hand Mixed	Machine Processed
Various mix ratio by weight	Free Rise Density 35kg/m³ to 50kg/m³	✓	

Applications

- SURFBOARD BLANKS (CORES)

APTANE®

- SFS - SPRAY FOAM SYSTEMS
- PFS - POUR / INJECTION FOAM SYSTEMS
- BFS - BLOCK FOAM SYSTEMS

POLYURETHANE FOAMS FOR CRYOGENIC APPLICATIONS

Applied Polymers, leaders in cryogenic and pipeline insulation are a division of **Era Polymers**. Specialising in tailor made polyurethane systems, most notably high performance rigid insulation systems for the LNG industry.

Applied Polymers has been producing and formulating tailor made **APTANE®** Polyurethane Systems in Australia since 1972.

Offering innovative solutions to each customer's specific system and processing requirements for over 40 years.

For more information on **Applied Polymers** range of foams please visit:

www.appliedpolymers.com.au

APPLICATIONS

- Pre-Insulated Pipe
- Valve Box / Flange Insulation
- Pipe Supports
- Tank Walls

ANCILLARY PRODUCTS

- CRYOGENIC ADHESIVE
- ERALEASE LP57
- ERACLEAN
- ERASOLVE
- REACTINT DYES
- MACHINE FLUSHING AGENTS

APPLIED POLYMERS

Strategic Foam Alliances

Agency Products

Whilst the range of Polyurethane Foams Systems manufactured by Era Polymers is extensive, a complimentary range of products are expertly sourced from around the world to strengthen the Era Polymers product range:

Stepan – Polyurethane Foams based on New Blowing Agents

ICP Adhesive & Sealants – 1 & 2 Component Disposable Polyurethane Foam Systems

Stepan® Polyurethane Foams based on New Blowing Agents

ICP ADHESIVES & SEALANTS 1 & 2 Component Disposable Polyurethane Foam Systems

Era Polymers Pty Ltd is the Australian distributor for Fomo Products Inc. of Ohio, USA. Fomo is the largest global manufacturer of the **one and two component** polyurethane foam systems in pressurized disposable packaging.

Handi-Foam two component systems form a permanent, crack resistant barrier and bond quickly to almost any surface, including wood, masonry, metal, glass and plastic.

Two-Component **Handi-Foam**; a chemically cured foam is better suited to larger applications, tack free in 30-60 seconds, cuttable in 2-5 minutes and fully cured within an hour. It can be sprayed or poured into cavities/ voids and onto surfaces. The two-component systems are available in disposable cylinders or tanks in a variety of densities and sizes. The foam provides a cost effective way to insulate an entire house.

This spray-in-place system offers a permanent air barrier to the elements that can last for the life of your home and does not settle or sag overtime. It can reduce energy bills by up to 50%, improve indoor air quality by reducing allergens, act as a pest deterrent, it is fire rated and helps control moisture content.

Once cured, the foam can be trimmed, sanded and painted.

Fomo Silent Seal is a PIR foam that is approved for use in mines as a ventilation sealant that quickly and efficiently creates an air tight seal on and around mine ventilation devices, including metal and block stoppings resulting in improved ventilation efficiency.

Foam Dispensing Equipment

To complement the **Era Polymers** vast array of polyurethane foam formulations, dispensing equipment via the **Era Polymers** Machine Division can be provided to support the foam products.

Advantages of machine processing include:

- **Improved mixing quality** - Finer & improved foam cell structure
- **More accurate dispensing** - Foam is always "on ratio"
- **Less wastage** - Lower overall costs
- **Cleaner production facility**
- **Improved efficiency** - Lower costs & better quality foam

There are two types of machine mixing available:

Low Pressure

The foam is mixed in a chamber with a rotary mixer. Low pressure is good entry level machinery; it's economical and is suitable for both low and high volume pours.

High Pressure

Mixing is done through "impingement" mixing where by the two chemical streams are mixed by colliding at high pressures. There is no need to flush the mixing chambers after pouring as the high pressure heads are self cleaning.

Era Polymers have formed strategic alliances with machinery and equipment specialists in order to provide you with a full service to process your foams.

GAMA — High Pressure Spray Equipment for Foams and Elastomers

High and Low Pressure Equipment for Foams

FECKEN FK KIRFEL — Cutting Equipment

Era Polymers machinery department has in-depth knowledge of these brands and can advise on the most suitable dispensing equipment for your application. A spare parts inventory is on hand at our Sydney head office as well as our technical team who can provide support.

Era Polymers can supply:

Foam Dispensing Equipment for SPRAY or POUR foams depending on the machine combination chosen ELECTRIC and HYDRAULICALY operated proportioning units with a selection of dispensing guns.

A range of cutting equipment for the processing of flexible foams, where foam blocks need to be cut to length, trimmed, split into thin sheets, profiled slabs or cut into shaped parts etc. depending on their final applications.

Foam Dispensing Equipment

GAMA Spray Equipment

Gama focuses its activities on the design, manufacturing and commercialisation of equipment and accessories for the foaming of polyurethanes and the application of two component polyurea coatings.

The design and manufacture of polyurethane dispensing equipment demands experience, creativity and innovative targeted engineering.

Gama is staffed by engineers and technicians highly specialized in commercial equipment design.

Gama has more than twenty years of experience in the design of high performance dispensing units for two component foam systems.

Foam Dispensing Equipment

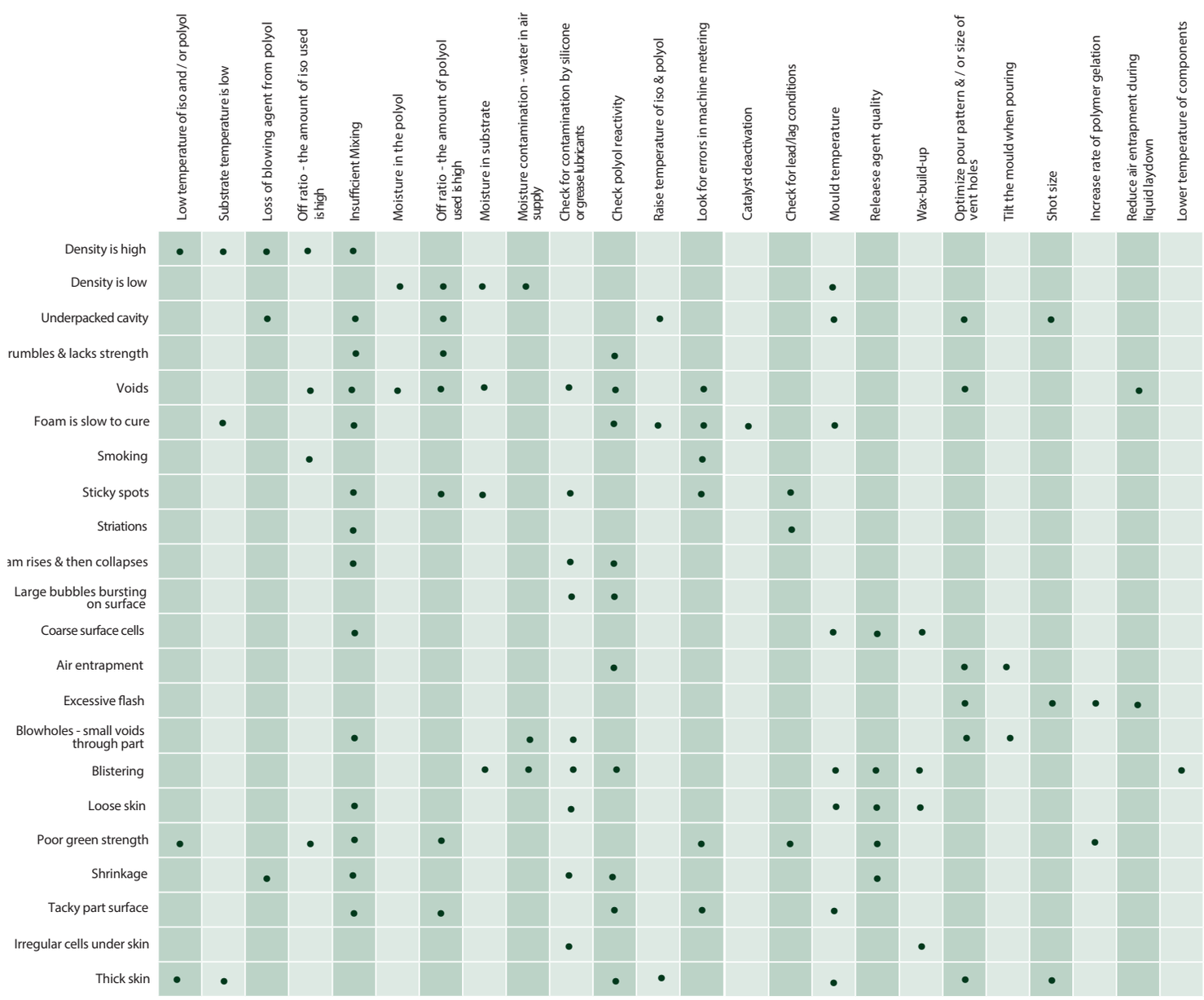
SAIP Equipment

Complete solutions for continuous and discontinuous production of sandwich and composite panels, complete solutions for the insulation of domestic and professional cabinet and refrigerator doors with expanded polyurethane, special systems for thermal insulation and pipe joints, specific technical solutions for turn-key projects and much more.

The range also includes a vast set of technologically advanced and extremely competitive dosing units: high pressure dosing units, low pressure dosing machines and low pressure elastomer dosing machines. SAIP works alongside Era Polymers and its customers to translate every need linked to the application of polyurethane into the best functional project.

Troubleshooting

List of commonly experienced problems and their solutions



Conversion Factors

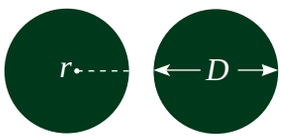
GEOMETRIC FORMULAE

CIRCLE

Area = πr^2 or $\pi D^2 / 4$

Circumference = πD or $2\pi r$

(r = radius, D = diameter, π= 3.1416)



SPHERE

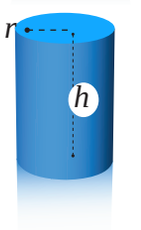
Surface Area = $4\pi r^2$ or πD^2

Volume = $\frac{4}{3}\pi r^3 = \frac{1}{6}\pi D^3 = D^3 \times 0.5236$

CYLINDER

Volume = $\pi r^2 h$

(h = height)



RECTANGLE OR SQUARE

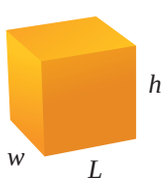
Area = L x h

(L = Length)

BOX

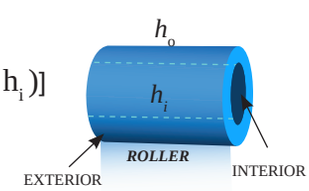
Volume = L x *w* x h

(*w* = width)



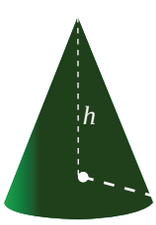
ROLLER

[Volume(outer) = ($\pi r_o^2 h_o$)] - [Volume(inner) = ($\pi r_i^2 h_i$)]



CONE

V = $\frac{1}{3}\pi r^2 h$



VOLUME TO MASS CALCULATION

mass = density x volume

THICKNESS

1 mil = 25 microns = 0.025 mm
1 mm = 40 mils = 1000 microns

AREA

1 m^2 = 10.76 ft^2
1 ft^2 = 0.093 m^2

LENGTH

1 m = 3.28 feet
1 cm = 0.4 inches
1 foot = 0.305 m
1 inch = 2.5 cm

PHYSICAL PROPERTIES

1 kN/m = 0.175 x pli
1 N/mm^2 = 145psi = 1 MPa

WEIGHT

1 kg = 2.2 lbs
1 lb = 0.455 kg

VOLUME

1 US Gallon = 3.8 Litres
4 US Gallon = 15.1 Litres
44 US Gallon = 166.3 Litres
55 US Gallon = 208.1 Litres

TEMPERATURES

°C = $\frac{5}{9}$ x (°F - 32)
°F = ($\frac{9}{5}$ x °C) + 32

PRESSURES

100 kPa = 0.1 MPa = 14.5 psi = 1 bar

DENSITY

1 g/L = 0.062 lb/ft^2
1 lb/sq.ft = 4.82 kg/m^2
1 ft^3 = 0.028 m^3
kg/m^3 = lb/ft^3 x 16

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