



Razeen® رزبن

We protect... We care... We apply responsible care...







*"These are exciting and challenging times..."*

## CEO Statement

These are exciting and challenging times in the Kingdom of Saudi Arabia, as we move away from an oil-dependent economy to a fully diversified industrial base. NAMA and its epoxy producing subsidiary, Jubail Chemicals Industries (JANA) is playing an important role in this transition. By following the most rigorous global standards for quality control and process management, we produce high-grade products that contribute to the safety and the quality of life of millions of people. We are deploying world-class technology in all our production plants and drawing on the finest expertise from around the world to implement best practices and the most exacting international standards for the industry.

We have set ourselves the goal of becoming the fifth largest producer of epoxy in the world by 2017 by increasing our capacities as well as investing in our raw material production.

## Mission

Our mission is to supply our customers with the highest-quality products and services while maximizing value for all our stakeholders through strategic growth. We insist on meeting the highest international standards in quality control, occupational safety and business practices. We take care of the environment as a core value, using the cleanest, most advanced technology. We maximize our human capital through education and pride ourselves on our integrity.

## Vision

At NAMA, we strive to meet our customers' needs consistently and to offer innovative solutions that enhance their satisfaction. We believe in the value of strategic business alliances. These factors make NAMA a leader in the chemical industry.

## About Jana

JANA - Jubail Chemical Industries Company situated in the Industrial City of Jubail, Kingdom of Saudi Arabia is an affiliate of Nama Chemicals and produces a range of Epoxy Resins - Liquid, Solution and Solid forms for a variety of applications.

JANA markets their epoxy resins under two brand names - Araldite® and Razeen®. The Araldite® brand is over 50 years old and very well known the world over. It is used under the license of Huntsman. JANA also has developed their own brand name, Razeen® under which they sell epoxy resins. Razeen® was introduced and launched in the year 2004 which has found acceptability by most of the customers. Currently, under the Razeen® brand name, all the products manufactured are look-a-like matching products to the Araldite® branded products licensed and sold by JANA. Jana produces and markets quality epoxy resins to exacting standards relied upon by many of today's leaders in the coatings, resin, composite and civil construction industries on a global basis.



*“Epoxy resins are used extensively  
for a number of applications”*

## Applications



Epoxy resins are thermosetting resins cured and converted to a thermoset state by chemical reaction between the resin and a curing agent. Depending upon the curing agent, this reaction can take place at elevated or at room temperature.

Most commonly used types are based on epichlorohydrin and bisphenol A and are available in range of molecular weights. The low molecular weight resins are liquid and high molecular weight resins are solid.

There are a number of properties of epoxy resin systems that influence the choice over other technologies in its application:

High chemical resistance against a wide range of corrosive conditions. This is derived from its chemical structure - Aromatic backbone and the phenolic ether bond for chemical stability.

Very good adhesion to a wide range of substrates - metal, wood, concrete, glass, ceramic and others. This is obtained due to the polar groups in the cured resin.

Low shrinkage and very good dimensional stability.

Can be easily fabricated.

Good physical properties such as toughness, flexibility and abrasion resistance.

Good thermal properties.

The largest end-user industry is the paint industry but the electrical industry is not far behind. Epoxy resins are used extensively for a number of applications including those summarized below:

Coatings  
Civil Engineering  
Structural Composites  
Electrical / Electronics  
Tooling & Adhesives  
Resins

- maintenance & marine, can/oil, automotives, pipes, rebar
- floorings, repair of mortars, crack injection
- laminates, filaments, mould pipes
- printed circuit board, insulations, potting, encapsulation
- molding compounds
- esterification as Vinyl or epoxy esters
- acrylation for uv cure
- adduct formation for curing agents
- as curing agents for acrylic non isocyanate cure 2 component paints





The properties of the basic bisphenol A resins can be modified in a variety of ways including combination with reactive diluents, novolacs and bisphenol F resins. These modifications are usually made to achieve a result for specific applications including a viscosity reduction for self levelling flooring and vacuum impregnation, to enable the formulation of a high solids or 100% solids liquid paint formulation or to improve the surface activity of the resin and make the product self emulsifiable for the production of water based coatings.

Jana has responded to these market needs by offering a carefully selected range of modified resins for the ever increasing applications of epoxy resin globally. The main modifications have been chosen for their reduced environmental impact and to help our partners to formulate tomorrows products for todays world of ever more demanding legislation and performance criteria





Epoxy resins are cured by employing a reactive hardener such as amines, acid anhydrides, phenolic resins which combine with epoxy and hydroxyl groups in the resin to form a thermoset product.

The most commonly used hardeners are polyfunctional amines, aliphatic amines, cycloaliphatic amines, aromatic amines, polyimide resins, acid anhydrides, phenolic resins, and few others. In order to get a finished product with durability and easy application, a number of other additives may be added such as Accelerators, Flexibilizers, Reactive Diluents, Pigments, Fillers, Solvents and other Additives.

## *Calculation of mix ratios for Razeen® Epoxy Resins*

The Epoxy content of the resin is given on the data sheet as either:

Epoxy Index (IE)      Unit (Eq/ Kg)      or      Equivalent Weight (EEW)      Unit (g/Eq)

The reactive groups of amine derived hardeners is given as the:

Active Hydrogen Equivalent Weight (AHEW) or (H)      Unit (g/Eq)

This is usually derived from the:

Molecular Weight / No. of Active Hydrogen

Example :	Amine Hardener	$\text{NH}_2 - \text{CH}_2 - \text{CH}_2 - \text{NH} - \text{CH}_2 - \text{CH}_2 - \text{NH}_2$
	Molecular Weight	103.2
	Active Hydrogens	5
		AHEW
		$103.2/5 = 20.6$

Epoxy Index  $\times$  H+ Equivalent (AHEW) = g hardener / kg resin    i.e.    [Eq./ kg]  $\times$  [g / Eq.] = g hardener / kg resin  
or more often

For each 100 g of resin / EEW in [g / Eq.]  $\times$  (H+ Equivalent) in [g / Eq.] = g hardener to cure 100 g of resin

or simply  $(\text{AHEW} (H+) \times 100) / \text{EEW of the epoxy resin}$

Example Formulation using LR1150 with EEW 186 and curing agent with AHEW 20.6  
 $20.6 \times 1000 / 186 = 11.08$  g hardener per 100g of LR1150

For blended systems or products containing either several epoxy types or pigments this becomes:

$\text{EEW (of Mixture)} = \text{Total Weight} / ((\text{Weight of component A} / \text{EEW A}) + (\text{Weight of component B} / \text{EEW B}))$

Example for a mix of 100 g each of two resins with EEW 186 (LR 1150 & LR 2257) and plus 200 g of fillers and other non reactive elements

EEW of "base" is then  $400 / ((100 / 186) + (100 / 186)) = 372$

hence the amount of curing agent  $20.6 \times 100 / 372 = 5.54$  g





*"Epoxy resins are versatile and offer excellent adhesion"*

## Liquid Resins

Jana produces a wide range of epoxy resins for every application including : solvent free coatings, water based systems, vacuum based systems, vacuum impregnation, acrylition grades for UV cure resins, electro-deposition grades for vehicle coatings, adhesives, windmills and civil construction. With track record spanning more that 60 years, epoxy resins are versatile and offer excellent adhesion, chemical resistance, safety and compatibility.

RAZEEN®	ARALDITE® Equivalent	Epoxide Index (EI) Eq/kg	Epoxy Equivalent Weight (EEW) G/Eq.	Viscosity @25 °C (ISO 12058-1) mPa.s	Remarks
LR 1100	GY 6010	5.20 - 5.49	182-192	11000 - 14000	Unmodified general purpose resin for solvent free coatings, matrix adhesives, civil engineering, filament winding, acrylation, resin production
LR 1110		5.32-5.49	182-188	10000 - 12000	General purpose resin but with lower hydrolysable chlorine content for electrical and electro-deposition (catephoretic) applications and composite pipes
LR 1120		5.46 - 5.68	176 - 183	9000 - 10500	Low viscosity resin for solvent free coatings, self levelling flooring, contruction repairs (crack repair injection compounds) putties, vacuum impregnation and UV resins
LR 1140 B		5.30 - 5.55	175 - 185	8000 - 10000	Low viscosity for UV cure resins, High Solids, Civil construction, self levelling floors & electrical applications
LR 1150	GY 250	5.30 - 5.55	180 - 189	10000 - 12000	Medium viscosity universally applicable resin for solvent free coatings, self levelling flooring, contruction repairs (crack repair injection compounds) putties, vacuum
LR 1160		5.20 - 5.43	184 - 192	12000 - 15000	Medium viscosity & low hydrolysable chlorine content for UV Cure resins, High Solids, electrical and electro-deposition (catephoretic) applications
LR 1170		5.20 - 5.43	184 - 192	12000 - 16000	Unmodified general purpose resin for solvent free coatings, matrix adhesives, civil engineering, acrylation, resin production lower crystallisation
LR 1200	GY 6020	5.00 - 5.40	185 - 200	16000 - 20000	High viscosity resin for adhesives, pre pregs, tooling, mastics and civil engineering repair compounds
LR 2253		5.40 - 5.81	172 - 185	800 - 1400	Reactive diluent modified, low viscosity non-crystalising resin with good alkali & solvent resistance. Used primarily in solvent free coatings, self levelling flooring, vacuum impregnation and wind energy applications.
LR 2254		4.76 - 5.26	190 - 210	600 - 1200	Reactive diluent modified, low viscosity non-crystalising resin with good mechanical properties, chemical resistance and FDA approval. Used primarily in coatings & flooring for food and pharmaceutical processing areas.
LR 2257	GY 257	5.20 - 5.50	180 - 192	500 - 700	Reactive diluent modified, low viscosity non-crystalising resin with good acid resistance but reduced solvent resistance. Used primarily in flooring, vacuum impregnation and as a viscosity modifier in other systems
LR 2280		3.57 - 4.45	225 - 280	450 - 700 ***	High viscosity resin for adhesives, tooling, mastics and for blending with oil free polyesters & acrylics to improve adhesion and chemical resistance
LR 2351		5.52 - 5.95	168 - 181	4500 - 6000	Low viscosity AF resin, High Solids, Civil construction, self levelling floors & electrical applications

\*\*\* 70% in butyl carbitol

All liquid resins supplied as maximum colour 100 Apha unless specified on the Technical Data Sheet



*“These versatile resins have been used  
in the most demanding environments”*

## Solution Resins



Jana produces epoxy solution resins based on Xylene to cater to the demands of the surface coatings industry. These versatile resins have been used in the most demanding environments with a variety of curing agents to suit the application, polyamido-amides for ease of use, amino resins, amine adducts, amines, phenol formaldehyde and phenalkamines for low temperature or high solids. The permutations illustrate the versatility of these grades and their importance to the coatings industry.

RAZEEN®	ARALDITE® Equivalent	Solids Content (+/- 1)	Epoxide Index (EI) Eq/kg	Epoxy Equivalent Weight (EEW) G/Eq.	Viscosity @25 °C (ISO 12058-1) mPa.s	Remarks
SL 4071X75	GZ 471X75	75%	1.42 - 1.67	600 - 700	5000 - 10000	Type 1 solution for higher solids coatings for metal, concrete, maintenance coatings, primers and finish coats and floors. Good corrosion resistance and adhesion
SL 4171X75	GZ 7071X75	75%	1.49 - 1.67	600 - 670	8000 - 12000	Type 1 solution for general purpose coatings, maintenance coatings, primers, finish coats and flooring.
SL 4171X80		80%	1.51 - 1.78	560 - 660	3500 - 7000	Lower molecular weight giving improved compatibility with acrylics and alkyd-amino systems for improved chemical resistance
SL 4072X75		75%	1.43 - 1.67	600 - 700	20000 - 50000	Type 2 solution for general purpose coatings, maintenance coatings, primers, finish coats and flooring.
SL 4280X80	GZ 280X80	80%	3.87 - 4.27*	234 - 258	625 - 1275	Lower molecular weight giving improved compatibility with acrylics and alkyd-amino systems for improved chemical resistance
SL 4150X90		90%	4.17 - 5.00*	200 - 240	625 - 1275	Lower molecular weight giving improved compatibility with acrylics and alkyd-amino systems for improved chemical resistance

\* On 100% Basis





*“Epoxy plays an important role  
of prolonging the life of our investments”*

## *Solid Resins*

Solid resins are available in a wide range of molecular weights to suit every application from powder coatings and epoxy ester production to can and coil coatings meeting the requirements of the FDA. Functional powders play an important role in prolonging the life of our concrete structures and with improved flow, powder coatings are used increasingly in industries traditionally associated with liquid coatings including the automotive industry. Jana manufactures 7 and 9 type resins which can not only be used for food contact materials meeting the requirements of the FDA but also cured with poly-isocyanates to give urethane epoxies for pilings, pipes and marine applications..

RAZEEN®	ARALDITE® Equivalent	Epoxide Index (EI) Eq/kg	Epoxy Equivalent Weight (EEW) G/Eq.	Viscosity @25 °C (ISO 12058-1) mPa.s 40% solution in butyl carbitol	Softening Point °C (DIN 51920)**	Remarks
SR 5071	GT 7071	1.89 - 2.22	450 - 530	200 - 500	77 - 82	Unmodified type 1 - typically used to formulate anti corrosive primers and finishes. May agglomerate if stored at elevated temperature
SR 5072	GT 7072	1.43 - 1.67	600 - 700	280 - 340	82 - 90	Type 2 - typically used to formulate solvent based anti corrosive primers and finishes and improved flow in powder coatings.
SR 5013	GT 7013	1.38 - 1.54	650 - 725	370 - 490 <sup>1</sup>	85 - 92	3 type with good gloss and flow, suitable for general purpose and hybrids with good gloss.
SR 5004	GT 7004	1.33 - 1.40	714 - 752	500 - 600	95 - 106	3½ type with good gloss and flow, suitable for general purpose and hybrids with good gloss
SR 5014	GT 7014	1.29 - 1.38	725 - 775	500 - 650 <sup>2</sup>	~ 90	3½ type with good gloss and flow, suitable for general purpose and hybrids with good gloss
SR 5184	GT 6084	1.12 - 1.20	835 - 895	550 - 700	99 - 105	Type 4 for Epoxy ester production and powder coatings with good corrosion resistance and edge cover
SR 5074	GT 7074	0.85 - 1.07	935 - 1175	900 - 1200 <sup>3</sup>	97 - 110	5½ type for functional powders with good adhesion, flexibility, improved impact resistance and edge cover
SR 5174		1.30 - 1.45	690 - 770	350 - 500	85 - 95	Master batch with 5% flow agent for improved flow and easy production processing
SR 5334	GT 6750	1.31 - 1.42	704 - 763	230 - 320	~ 87	Flow agent modified type 3 resin, recommended for hybrids. Excellent flow properties
SR 5274	GT 2874	1.15 - 1.35	740 - 870	350 - 550	85 - 95	Master batch with 10% flow agent for improved flow and easy production processing
SR 5284		1.05 - 1.11	900 - 950	500 - 700	98 - 105	Master batch with 0.5% flow agent for improved flow and easy production processing

\*\* Mettler Toledo (type FP90)

<sup>1</sup> Cone and plate at 150 °C (2200 - 3200 mPas)

<sup>2</sup> Cone and plate at 150 °C (3100 - 4700 mPas)

Jana's Type 7 and Type 9 epoxies meet the requirements of the FDA

<sup>3</sup> Cone and plate at 175 °C (3000 - 6000 mPas)

<sup>4</sup> Cone and plate at 200 °C (2400 - 3700 mPas)



*Jana manufactures 7 and 9 type resins that are used to protect canned goods from corrosion*

## *Solid Resins*



RAZEEN®	ARALDITE® Equivalent	Epoxide Index (EI) Eq/kg	Epoxy Equivalent Weight (EEW) G/Eq.	Viscosity @25 °C (ISO 12058-1) mPa.s 40% solution in butyl carbitol	Softening Point °C (DIN 51920)**	Remarks
SR 5357	GT 7255	1.17 - 1.29	775 - 855	1000 - 1600 <sup>4</sup>	~ 110	Type 7 phenol novolac modification for functional powders with very high chemical resistance and high Tg
SR 5097	GT 7097	0.52 - 0.66	1515 - 1920	1070 - 1760	100 - 118	Type 7 for can and coil coatings, may also be used for "effect" powders.
SR 5197		0.53 - 0.59	1695 - 1885	1800 - 2600	100 - 118	Type 7 for can and coil coatings, may also be used for "effect" powders.
SR 5198	GT6609	0.34 - 0.42	2380 - 2940	3500 - 5500	~ 150	Type 9 with reduced viscosity for high solids for can and coil coatings, may also be used for ambient cure epoxy polyurethanes when cured with polyisocyanates to give excellent corrosion resistance and thin film weldable primers.
SR 5199	GT 6099	0.34 - 0.42	2380 - 2940	5000 - 10000	143 - 158	Type 9 for can and coil coatings with improved mechanical properties, may also be used for ambient cure epoxy polyurethanes when cured with polyisocyanates to give excellent corrosion resistance and thin film weldable primers.

\*\* Mettler Toledo (type FP90)

<sup>1</sup> Cone and plate at 150 °C (2200 - 3200 mPas)

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*"Jana promotes product improvement  
without harming the environment"*

## Safety, Health, Environment and Quality

At Jana, we believe in quality throughout the company to satisfy our customers in terms of products, service and support. These we do while complying with the international Safety, Health and Environmental regulations. Our state of the art plant is amongst the best in the world and delivers quality relied on by the most demanding of customers. ISO certification is the gold standard of quality and reliability and Jana is fully committed in utilising the latest technology to achieve this. With the latest in plant and analytical facility to support it, Jana truly makes quality count.



*Our commitment towards Quality, Environment  
and Health & Safety of our workers will always be  
part of our system.*

## SHEQ

### Safety, Health, Environment & Quality Policy

*It is NAMA's Policy to protect the health of its employees, contractors, neighbours and customers and to preserve the environment while providing quality products that meet the expectations of our customers.*

*We will comply with applicable safety and environmental laws, regulations and quality standards. We will apply practical means to minimize pollution, reduce waste and minimize risk of operations.*

*The company will promote a strong sense of safety awareness among its employees. Safety will always be a factor in the design and construction of new facilities. We will develop operating procedures and train our workers to ensure that they understand the hazards of the work environment and that they can operate the process plants in a safe and environment friendly manner.*

*We will continually improve our performance and implement effective development system to enhance the competence and awareness of our multicultural employees to achieve sustainable results and to comply with SHEQ regulations.*



For Further details on EHS, handling and first aid regarding Jana products, please go through the Material Safety Data Sheets (MSDS). Request MSDS by sending email to [safety@nama.com.sa](mailto:safety@nama.com.sa)



*"Nama Chemicals leads  
the way with compliance"*

All of its products meet the requirements of REACH.  
Our registration numbers for those products requiring full  
registration are as follows:

Epichlorohydrin 01-2119457436-33-0021

Epoxy Resin 01-2119456619-26-0012

Sodium Hydroxide 01-2119457892-27-0055

All other products comply according to the timetable published by  
the ECHA

For ongoing updates please visit the Jana web page  
[www.jana-ksa.com](http://www.jana-ksa.com)



**Razeen®** رزبن  
CURE

**Razeen®** رزبن  
ADVANCE

**Razeen®** رزبن





JANA is a subsidiary of NAMA Chemicals

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*Right epoxy...  
... better world*

**Razeen®** رزبن



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