RECYCLAMINE

THE PLANET IS MINE

AN INVITATION TO TRANSFORM THE PLANET FOR GOOD.

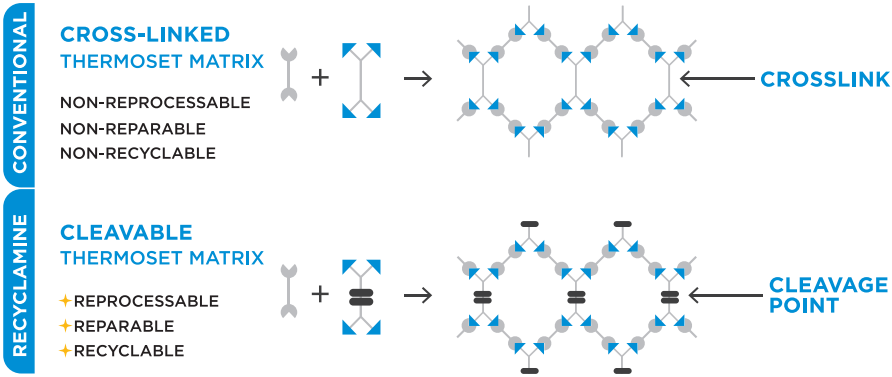
Non-recyclable thermoset composites are piling up, triggering an urgent environmental crisis. The need for a sustainable solution has never been more pressing.

We present to you Recyclamine - a game-changer in materials science. It doesn't just revolutionise the world of thermoset composites; it breathes new life into non-recyclable Epoxy composites. It leads the way for perpetual recyclability as it allows the composites manufactured using Recyclamine to be recycled, reused and repurposed, unlike conventional non-recyclable thermoset composites.

At the heart of Recyclamine is a philosophy that goes beyond products, influencing every decision with a call for internal change. Our world breathes sustainability, echoing not as a mere concept but as a living entity, demanding a mindful transformation. Believing in shared ownership of Earth, we unveil our mantra, "**The Planet is Mine**" – an open invitation for individuals to script a sustainable future through conscientious choices.

REDEFINING COMPOSITES. REIMAGINING TECHNOLOGY.

Recyclamine is a patented technology that allows Epoxy-based composites, which are conventionally non-recyclable, to be recycled, reused and repurposed. The technology incorporates unique Epoxy resins and curing agents, featuring meticulously engineered cleavage points at cross-linking sites. Under specific conditions, a simple recycling process transforms thermoset Epoxies into thermoplastics, facilitating the recovery and reuse of reinforcing fiber, Epoxy matrix and other parts in composites. This is how we nurture our belongingness to the planet, one recycled composite at a time.



EPOXY RENEWED.
FUTURE REWRITTEN.

The Epoxy systems formulated using Recyclamine Technology exhibit a wide range of properties, accommodating fast to slow reactivity and latency, low to high thermal and chemical resistance, low to high glass transition temperature and diverse mechanical properties. This enables applications across a variety of industries where composites are used. Moreover, seamless integration into your existing processes without the need for changing manufacturing setup or changing process parameters makes it a smooth transition when adopting a Recyclamine system.

The Recyclamine Technology has been successfully commercialised in the wind, automotive, sports & recreation industries. The versatility of this technology makes it an ideal choice for all application segments and manufacturing processes utilising Epoxy thermosets. By simplifying this change, we empower everyone to be part of the transformation for a better planet.

BE A PART OF THE GREATER CHANGE.

SEAMLESS ADOPTION

Embrace Recyclamine effortlessly. Adopting Recyclamine in your process requires no additional operational costs, no capital expenditure and no workforce retraining.

VERSATILE APPLICATIONS

Caters to diverse manufacturing processes such as infusion, lay-up, prepreg, RTM, compression moulding, filament winding, etc. It seamlessly aligns with the requirements of industries like wind, sports, automotive, aerospace, marine, etc.

PERFORMANCE DRIVEN

Maintain the high standards of Epoxy systems with Recyclamine, offering advantages in chemical resistance, flexibility, adhesion, weatherability, toughness, stability and more.

REGISTERED PRODUCTS

These products are certified and registered under appropriate authorities like REACH, TSCA, etc. Selected systems are also DNV-GL-approved.

EFFICIENT RECYCLING PROCESS

The recycling process is known for its efficiency, cost-effectiveness, and simplicity, featuring low energy consumption and no need for high temperatures or pressure.

ZERO-WASTE MANUFACTURING

The composite waste generated during manufacturing can be efficiently recycled and the recovered materials are suitable for crafting a variety of components.

VALUABLE RECOVERED MATERIAL

The properties of recovered reinforcement fibers are comparable to virgin fibers. Recovered Epoxy thermoplastic can be used as it is or compounded with other thermoplastics.

VALUE AT THE END-OF-LIFE

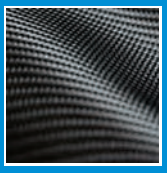
Components made with Recyclamine can be recycled and the recovered material can be reused, contributing not only to a circular economy but also yielding tangible savings and revenue streams.

SERVICE & CLOSE COLLABORATION

We serve customers around the world through our global network. Innovation is in our DNA and to enable the seamless adoption of this pioneering technology, our technical team engages closely with customers to comprehend their specialised requirements.

CLOSING THE LOOP. OPENING THE GATES TO SUSTAINABILITY.

The process of recycling parts made using Recyclamine is efficient, cost-effective and simple. It has low energy consumption and operates at low to medium temperatures. The properties of recovered fibers are comparable to virgin fibers. Similarly, the recovered Epoxy thermoplastic can be used alone or by compounding with other thermoplastics to make plastic components. The recycling of manufacturing waste and end-of-life composite waste not only closes the loop but also realises tangible value, fostering a sense of belongingness for a greener, more sustainable future.



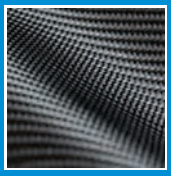
GLASS FIBER/
CARBON FIBER

RECYCLAMINE
EPOXY SYSTEM

COMPOSITE
MANUFACTURING
WASTE

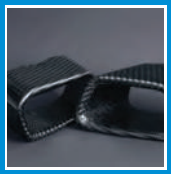
END OF LIFE
WASTE

RECYCLING PROCESS



RECOVERED
FIBER

RECOVERED
THERMOPLASTIC



RE-USE OF
RECOVERED FIBER

RE-USE OF
RECOVERED RESIN

The Recyclamine-formulated Epoxy systems allow Epoxy thermosets & composites, which are conventionally non-recyclable, to be now recycled, reused and repurposed. Shown are some systems with their typical properties.

RECYCLAMINE SYSTEMS	MIX RATIO[1]	MIX VISCOSITY[2]	POT LIFE[3]	TG[4]	FEATURES
Recyclamine 001RG/004H	100 : 24	<300	35-45	>80	Bio-based system with low initial mix viscosity, short demolding time, ambient cure system ideal for Infusion, light RTM and Lay-up processes.
Recyclamine 001R/001H	100 : 26	<300	80-120	>75	Low initial mix viscosity, moderately reactive system for Infusion, Lay-up. Light RTM, etc.
Recyclamine 002R/003H	100 : 30	1000-3000	25-40	75-85	Ambient curing system designed for Compression Molding Process.
Recyclamine 003R/005H	100 : 26	200-400	>240	75-90	Slow-reacting system with longer pot life for Infusion, RTM, Lay-up, Filament Winding, etc.
Recyclamine 008R/026H	100 : 39	650-850	25-35	55-65	Low initial mix viscosity, fast & complete impregnation of reinforcing fibers such as glass, carbon and poly-aramide.
Recyclamine 016R/023H	100 : 31	800-1000	110-150[5]	>75	Laminating system for wet lay-up process, suitable for repairing process defects.
Recyclamine 015R/022H	100 : 34	1000-1300	30-60[5]	>75	Laminating system for wet lay-up process, suitable for onsite repairs.
Recyclamine 001RG/013H3	100 : 28	250-350	400-600[7]	100-110	Bio-based resin system with ultra-slow reactivity and low initial mix viscosity that enables fast & complete impregnation of reinforcing fibers.
Recyclamine 005R/012H	100 : 40	2000-3000	>900	95-105	Designed for Prepreg & SMC; also suitable for other processes due to its processing properties and semi-latent characteristics.
Recyclamine 017R/025H1_025H2	100 : 26	<300	150-450[7]	75-85	Designed to provide excellent processing properties for various composite fabrication techniques like wet layup, RTM, infusion (RI), pultrusion, filament winding, etc. under varying environmental conditions.
Recyclamine 014R/021H	100 : 43	250k-350k (paste material)	120-160[6]	75-85	Toughened, thixotropic adhesive system with excellent sag resistance. Suitable for structural applications.
Recyclamine 010R/013H3	100 : 26	600-1000	>250[7]	105-115	Moderate viscosity, toughened system designed for wet winding process.
Recyclamine 019R/027H	100 : 20	-	35-40[8]	80-90	Expandable foam system with cured density 170-180 gm/cm^3. Suitable as core material for sandwich construction.

NOTE: [1] Part by weight [pbw], [2]mPa-s @ 25°C, [3] in minutes at 100 gms mix @ 25°C, [4] in °C, [5] in minutes at 150 gms mix @25°C, [6] in minutes at 100 gms mix @ 35°C, [7] in minutes at 1000 gms mix @ 25°C, [8] in minutes at 1000 gms mix @ 20°C.

WIDE-RANGING APPLICATIONS.

SUITABLE FOR VARIETY OF PROCESSES

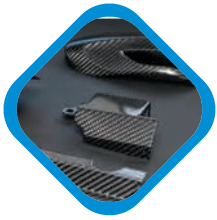
WET LAY-UP

INFUSION

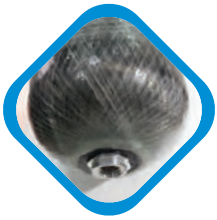
COMPRESSION MOLDING

RTM/ VARTM

PREPREG



SMC



FILAMENT WINDING

PULTRUSION

WIDE-RANGING APPLICATIONS.

IDEAL FOR DIVERSE INDUSTRIES

SPORTS

WIND

MOBILITY

AEROSPACE

MARINE

ARCHITECTURE

INDUSTRIAL

CONSTRUCTION

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ADVANCED MATERIALS

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