ARKEMA

ELIUM®

The recyclable liquid thermoplastic resin for all composites

ELIUM®

Arkema, the speciality materials specialist, is forever seeking further innovation in response to economic and environmental challenges. Elium® is one such innovation; a resin with unique properties, allowing the products and systems that use it to be recycled, and offering comparable performance to traditional resins. Reactive at low temperature, easy to use, performance, improved productivity and recyclability, Elium® resin is a breakthrough innovation.

>> Learn about its properties and potential

Elium® thermoplastic resin offers a unique solution for manufacturing composite parts using the same methods as those used for standard liquid resin parts, and include the major advantages of recyclability, more energy efficient production.

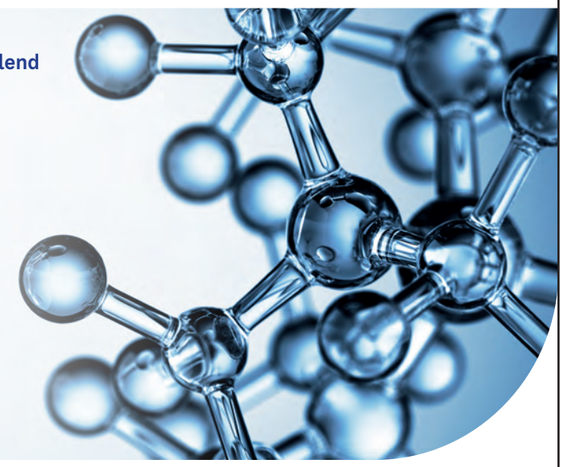
The resin is a liquid polymer diluted in a reactive monomer blend with processing additives

Two components are needed :
Resin + initiator (organic peroxide and/or photoinitiators)

The polymerization can be adjusted to fulfill manufacturing process requirements (T°, UV, time)

The obtained high molecular weight thermoplastic reinforced polymer is fully recyclable

Elium® resin is styrene free, BPA free and Cobalt salt free



PERFORMANCE

- **High strength** and **Lightweight**
- **Toughness** and **Impact resistance** with ductile failure behaviour
- Very good **UV resistance**
- Tg *(tan Delta)* ~ 115°C

PROCESSABILITY

- **Low viscosity** (100 to 500 cP)
- **Adjustable reactivity** (2min to +180min)
- **Cure at room or high temperature** (up to 120°C)
- **Thermoforming**
- Easy bonding, **welding and overmolding**
- **Low toxicity** (Styrene, BPA and Cobalt free)

RECYCLABILITY

- **Compounding** grinding and blending with virgin matrix eg PMMA, ABS, PC, PVC...
- **Depolymerisation** Separation of monomer and fiber reinforcement. Collection of the original monomer of the resin and possibility to reuse the monomer for the same purpose.

FOR WIND ENERGY

Infusion, hand lamination and pultrusion resins for "designed for recycling" wind turbine blades.

FOR MARINE

Fast cure liquid reactive thermoplastic resins for structural composites:
- Productivity
- High performance
- Recyclable

SEMI FINISH PRODUCTS

- Rebars, pultruded profiles, tapes, prepregs,
- Wide network of semi finish product manufacturers to supply the right component.

Whatever you need a high strength, lightweight or durable composite parts, Elium® resin is the perfect solution for all your products, compatible with all fibers and most of manufacturing process. With its unique liquid feature and adjustable reactivity at low temperature, Elium® resin can be used with the same methods as those used for thermoset resins with the major advantages of recyclability.

2 min
Fastest reactivity time with Elium® 591

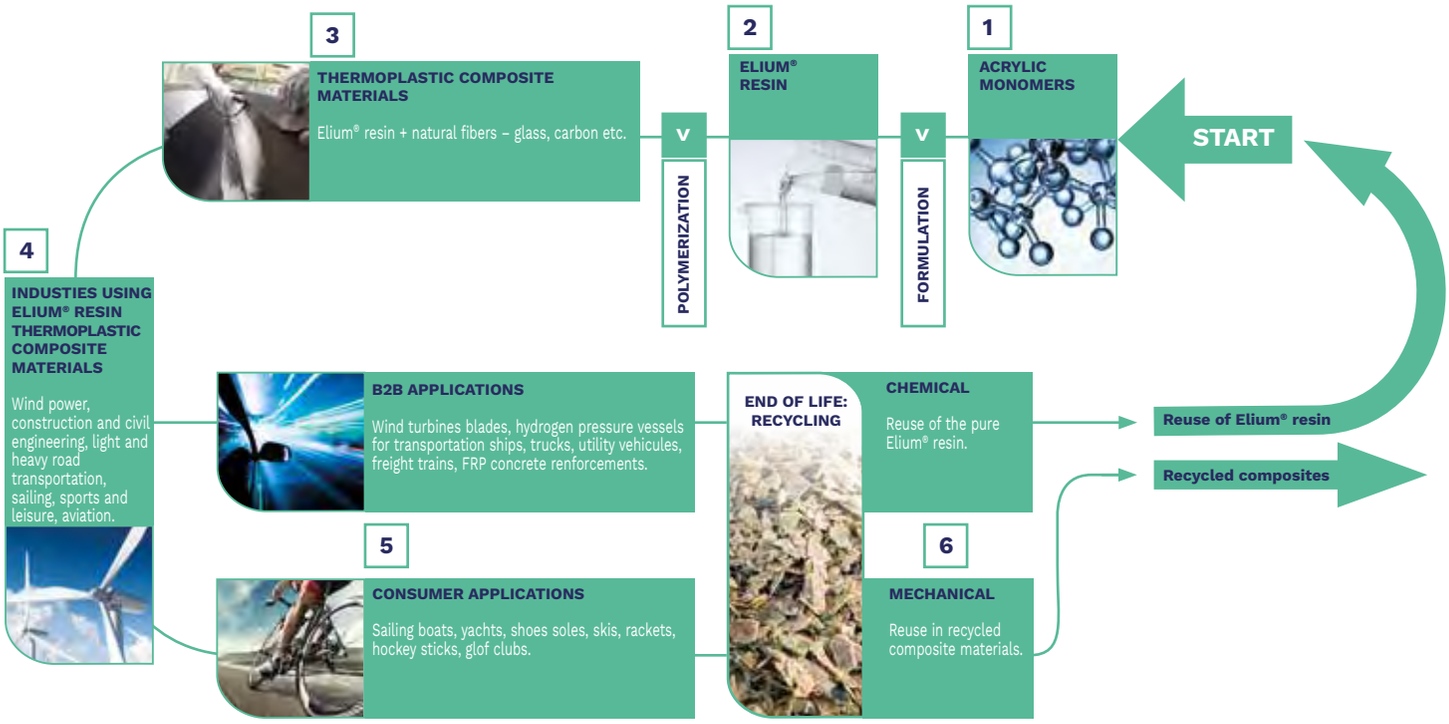
5m Pa.s
Lowest viscosity with Elium® C040

3 GPa - 54 MPa
Typical Tensile Modulus and Strength of Neat Cured resin

Find Elium® resin adapted to your products and process with our product selector.

The challenge of recyclable composites and end of life wastes

With the growing demand in lightweight and high strength structures, the composites materials are offering the perfect solution for all industry and products with a main limitation: environmental and end of life considerations. The Elium® thermoplastic resins make it possible to manufacture composite that are recyclable.



Since 2012, Elium® thermoplastic resin is reinventing composites materials and opening the way to recyclability. Arkema is continuously collaborating with key partners and leading companies in all markets to make our products and service better.

"Building a sailboat in recyclable thermoplastic composite is a world first."

Skipper LALOU ROUCAYROL and his Lalou Multi racing team have been involved in the Elium® resin story from the beginning. With the creation of the Arkema 3 prototype, a monohull whose hull and deck are entirely made from Elium® and the new Arkema 4 Ocean Fifty, a true floating laboratory that also draws on the strengths of this resin.

"Elium® thermoplastic resin is the missing link in blade recyclability."

VIANNEY DE LAVERNÉE, Head of Strategy, CSR and Innovation at ENGIE France Renouvelables,—are working to make them more durable and recyclable.

"By making it possible to bend composite reinforcements at distributors' or manufacturers' facilities, Elium® resin opens up decisive prospects for the industry."

ANTONIO NANNI, Professor and Director of the Department of Civil, Architectural and Environmental Engineering, University of Miami, United States RESEARCH AREA: construction materials (advanced composites and concrete), structural performance and industrial applications, including their inspection and renewal, with a focus on the sustainability of buildings and civil infrastructures.

"Elium® resin overcomes the production obstacles of thermoset resin reinforcements."

SONJA BLANC is Chief Executive Officer of Sireg Geotech. Since 2009, Sireg Geotech is specialized in thermoplastic, thermosettable and composite materials for ground consolidation during tunnel excavation, for the reinforcement and restoration of infrastructures, and damaged historic buildings.

Elium® in key dates

2012

First patent applications for Elium® resin formulations.

2014

Start of production at the Arkema plant in Mollet del Vallès (Spain), the United States, South Korea and China.

2016

Launch of the Arkema 3 Mini 6.50 boat, the hull and bridge of which are made from Elium® resin, and first racing competition.

2017

Arkema wins a JEC Asia Innovation Award for the use of Elium® resins for manufacturing Wind turbine blades.

2019

Arkema wins a JEC World Innovation Award together with Sireg Geotech, the University of Miami and the National Cooperative Highway Research Program for its "Bendable thermoplastic composite reinforcements for concrete"

2020

Launch of the ZEBRA project (Zero wastE Blade ReseArch) a multipartners consortium lead by IRT Jules Verne and LM Wind power to develop the first 100% recyclable blade.

2022

Elium® is the first thermoplastic resin to receive DNV certification for the renewable energy sector, with its Elium® 188 O and 188 XO grades.

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