

Composites technology

Making a material difference in automotive through chemistry



Making a material difference in the automotive industry



Araldite®

Manufacturers need solutions to help sustain their competitive edge and secure long-term growth. Production process improvement, innovation in design, weight savings, compliance to stringent safety and environmental standards, and low process costs have become vital to success. Huntsman Advanced Materials offers multiple innovative composite solutions including new process and simulation services dedicated to the automotive industry. Our specific range of composites solutions for the automotive industry meets your needs for both high performance and reduced production cycles.

The brand enabling lightweight solutions
in the worldwide composite industry
for more than 70 years



Productivity

OEM and tier manufacturers can optimize manufacturing efficiency with Huntsman fast curing resin solutions, our innovative DFCM manufacturing process and advanced process simulation tools.



High performance

With the Huntsman portfolio, automotive engineers can further push the boundaries of composites in highly demanding fatigue and impact-resistant applications.



Aesthetic

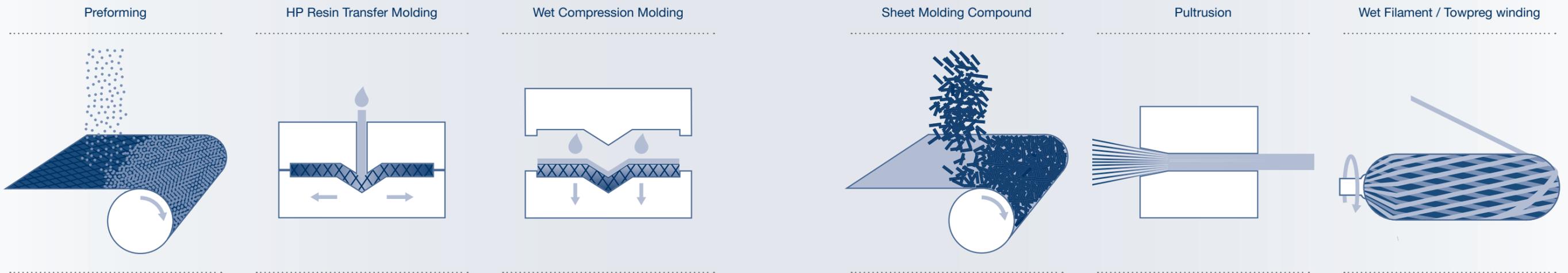
Using Huntsman chemistry allows the automotive industry to promote the use of composites in visually aesthetic parts, such as carbon composite wheels, without compromising on performance or productivity.



Fire resistance

Designers of battery housings can now use our unique halogen and filler-free FST chemistry, offering a new approach to manufacturing lightweight fire-resistant composites.

Our range of composite resins improve manufacturing performance through all processes



Bring production cycle to just 1 minute with our exclusive Dynamic Fluid Compression Molding Process

Autoclave quality in 1 minute

Combining a novel process and fast-cure Araldite® epoxy solutions, highly structural parts with outstanding properties can be produced in 1 minute.

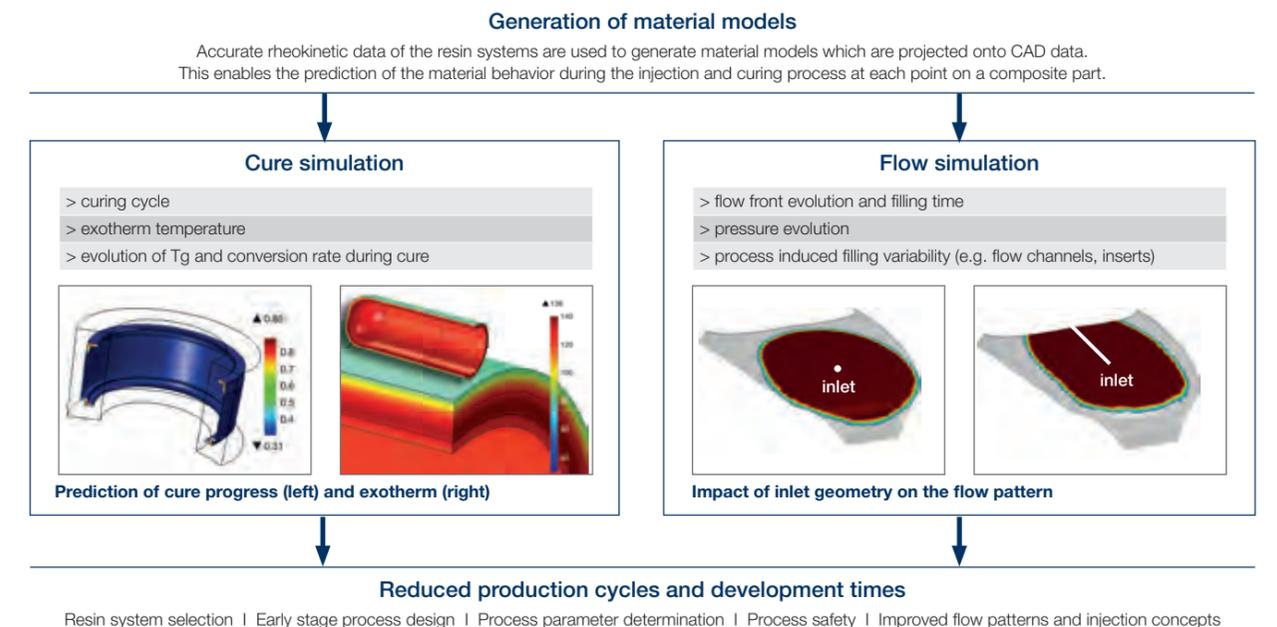
This process is simple, fast and cost effective, requiring low pressure (typically 30 bar) and often removing the need for a fiber preform.

Exceptional benefits versus standard wet compression molding: outstanding mechanical performance thanks to fiber volume content up to 65% in a low wastage process, simple processing, even with heavy-tow industrial reinforcements, void-free parts produced consistently straight from the mold.

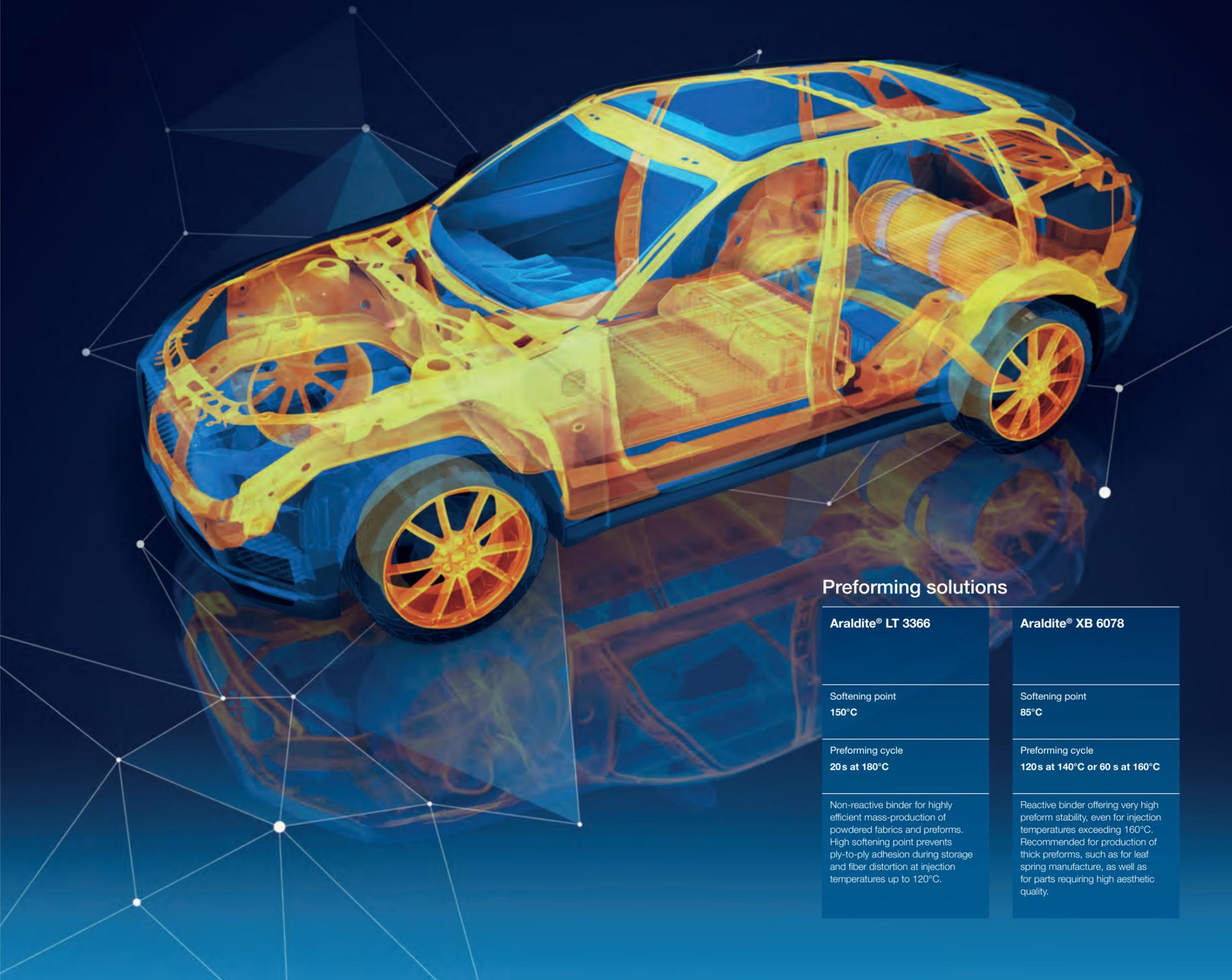
NEW exclusive DFCM process

- > Fiber volume content up to 65%
- > Void-free parts
- > Faster process vs. RTM
- > Simple processing of heavy-tow industrial fabrics
- > Pressure only 30 bar
- > Fiber wash eliminated
- > Low equipment investment
- > Reduced waste
- > Fiber preform not mandatory
- > Complex parts possible (medium draw or 2.5+D)
- > Consistent part quality

Tailor resin and process to any part using our simulation services



Araldite® fiber binders provide tailored preform solutions where robust processing is required



Binders for preforming

Araldite® fiber-preform binders are designed to meet the requirements of high-pressure RTM and wet compression processes in automotive composite applications including body in white, leaf springs, composite wheels and battery housings. The range covers all automotive preform types, from mass-production technology to high performance solutions offering high stiffness, improved mechanical performance and manufacturing of aesthetic composite parts.

Our composite resin systems answer the need for all manufacturing processes. If you don't immediately find the product you need, you can contact your sales or technical representative for more information on:

www.huntsman-transportation.com/automotive-composites →

Preforming solutions

Araldite® LT 3366	Araldite® XB 6078
Softening point 150°C	Softening point 85°C
Preforming cycle 20 s at 180°C	Preforming cycle 120 s at 140°C or 60 s at 160°C
Non-reactive binder for highly efficient mass-production of powdered fabrics and preforms. High softening point prevents ply-to-ply adhesion during storage and fiber distortion at injection temperatures up to 120°C.	Reactive binder offering very high preform stability, even for injection temperatures exceeding 160°C. Recommended for production of thick preforms, such as for leaf spring manufacture, as well as for parts requiring high aesthetic quality.

Araldite® composite solutions provide fast curing where high productivity is required



Composite resin systems for body in white

Araldite® composite solutions offer a broad portfolio of epoxy resin systems for manufacturing automotive body in white parts, covering all state-of-art processes including high-pressure RTM, wet compression molding, sheet molding compound and pultrusion. Systems offer ease of processing, combined with fast curing and high demold properties, enabling drastic reductions in cycle times.

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HP-RTM / WCM

Araldite® LY 3585 / Aradur® 3475

Glass transition temperature (Tg)
120 - 130°C

Cure time
2 min at 115°C (HP-RTM)
1 min at 140°C (WCM)

Fast cure solution offering enhanced processing (1 min injection window at 115°C), reduced curing cycle and improved toughness versus state-of-art technology (Araldite® LY 3585 / XB 3458 - BMW i-Series qualified system). High clarity system for production of cosmetic parts.

WCM

Araldite® LY 3031 / Aradur® 3032

Glass transition temperature (Tg)
110 - 120°C

Cure time
30s at 140°C

Very fast cure solution developed to improve productivity and meet requirements of structural automotive parts made by Wet Compression Molding (WCM) and Dynamic Fluid Compression Molding (DFCM).

SMC

Araldite® LY 3569 / Aradur® 1571 / Accelerator 1573 / Aradur® 1575

Glass transition temperature (Tg)
115 - 135°C

Cure time
5 - 10 min 150°C

Medium Tg B-stage epoxy SMC system for body in white parts. The system can be compounded on large sized SMC rolls and the resulting SMC retains very good drapability for 6 weeks at 23°C. A wide range of part thicknesses can be processed.

XB 50021 A / Aradur® 1571 / Accelerator 1573 / XB 50021 B

Glass transition temperature (Tg)
160 - 190°C

Cure time
5 - 10 min 160°C

High Tg B-stage epoxy SMC system for parts close to the engine. The system can be compounded on medium sized SMC rolls and the resulting SMC retains very good drapability for 6 weeks at 23°C. Allows processing up to medium part thicknesses.

Pultrusion

Araldite® LY 3585 / Aradur® 917-1 / Accelerator DY 080

Glass transition temperature (Tg)
120 - 180°C (adjustable)

Impregnation technology
Open bath and injection box

REACH compliant, robust anhydride solution with long pot-life, offering high surface quality for pultrusion parts. Cure profile and the resulting Tg can be adjusted depending on the application requirement.

Araldite® LY 3585 / Aradur® 3475

Glass transition temperature (Tg)
120 - 130°C

Impregnation technology
Injection box

Rapid cure epoxy / amine system for achieving fast line speed and productivity, whilst offering clean pultrusion processing. For automotive applications with medium Tg requirements.

Araldite® composite solutions provide high thermo-mechanical performance where fatigue resistance is required

Composite resin systems for leaf springs

Fast curing epoxy solutions with high thermo-mechanical properties and fatigue resistance, able to withstand long-term dynamic loading even under severe hot/wet conditions. Suitable for fast, robust HP-RTM processing, allowing efficient production of high-thickness composite parts.

Huntsman supports customers developing composite leaf spring technology with state-of-the-art hot/wet fatigue testing and computer simulation capabilities, enabling process optimization from the first leaf spring injection trials through to full qualification and serial production.

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HP- RTM

Araldite® LY 3585 / Aradur® 3831	Araldite® LY 3585 / Aradur® 3834
Glass transition temperature (Tg) 125°C	Glass transition temperature (Tg) 140°C
Cure time 5 min at 105°C	Cure time 5 min at 105°C
First generation system proven to withstand real-world fatigue loading under severe hot/wet conditions. A cured Tg of 125°C covers most customer leaf spring requirements.	Second generation solution offering a Tg in excess of 140°C without compromising fatigue resistance. Responds to the need for parts that can endure the harshest hot/wet conditions, such as those encountered close to the vehicle engine.

Araldite® composite solutions provide high pressure-cycling performance where burst resistance is required

Composite resin systems for pressure vessels

Araldite® solutions for composite pressure vessels cover a range of processes, from wet filament winding to RTM injection and towpreg winding systems. The range meets the thermo-mechanical and pressure-cycling requirements for compressed natural gas (CNG) vessels up to highly-demanding hydrogen applications. Huntsman supports customers developing composite pressure vessels with state-of-the-art computer simulation capabilities, enabling process optimization and accurate through-thickness property prediction.

Our composite resin systems answer the need for all manufacturing processes. If you don't immediately find the product you need, you can contact your sales or technical representative for more information on:

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Filament winding

Araldite® LY 1135-1 A / Aradur® 917-1 / Accelerator 960-1	Araldite® LY 1564 / Aradur® 917-1 / Accelerator 960-1	Araldite® LY 1564 / Aradur® 3474	Araldite® LY 3568 / Aradur® 1571 / Accelerator 1573	Araldite® LY 3508 / Aradur® 1571 / Accelerator 1573	Araldite® LY 3508 / Aradur® 3478
Glass transition temperature (Tg) 132 – 138°C	Glass transition temperature (Tg) 122 – 130°C	Glass transition temperature (Tg) 115 – 120°C	Glass transition temperature (Tg) 115 - 125°C	Glass transition temperature (Tg) 140 - 150°C	Glass transition temperature (Tg) 110 – 115°C
Pot life at 23°C 56 – 62 h	Pot life at 23°C 80 – 90 h	Pot life at 23°C 260 – 280 min	Fracture toughness 1.4 – 1.6 MPa.m ^{1/2}	Fracture toughness 0.9 – 1.1 MPa.m ^{1/2}	Fracture toughness 1.4 – 1.6 MPa.m ^{1/2}
REACH compliant anhydride based system. Very long latency combined with low reaction exotherm. Mix viscosity of 600-1000 mPas at 25°C.	REACH compliant anhydride based system. Very long latency combined with low reaction exotherm. Mix viscosity of 450-700 mPas at 25°C.	Amine based system with high mechanical performance, low-temperature curing capability and higher reactivity compared to anhydride systems. Mix viscosity of 500-650 mPas at 25°C.	Highly toughened system designed to withstand the extreme pressure-cycling requirements of hydrogen vessels manufactured via towpreg winding. Very long latency for ease of use, optimised manufacturing viscosity profile and fast curing for high productivity.	High temperature resistance system designed to satisfy the requirements of hydrogen vessels manufactured via towpreg winding. Very long latency for ease of use, optimized manufacturing viscosity profile and fast curing for high productivity.	Highly toughened system designed to withstand the extreme pressure-cycling requirements of hydrogen vessels manufactured via the HP-RTM injection process.

Araldite® composite solutions provide high thermo-mechanical performance where impact resistance is required

Composite resin systems for wheels

Araldite® solutions for composite wheels offer outstanding performance for both OEMs and after-market wheel producers. The high thermo-mechanical performance meets the most stringent safety requirements for impact and fatigue resistance, whilst innovative chemistry gives exceptional color and UV resistance, resulting in high aesthetic-quality parts. New generation products enable increased productivity for mass-production, offering the potential for wider market adoption of composite wheel technology.

Our composite resin systems answer the need for all manufacturing processes. If you don't immediately find the product you need, you can contact your sales or technical representative for more information on:

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HP-RTM

**Araldite® LY 8615 /
Aradur® 8615**

Glass transition temperature (Tg)
210 – 220°C

Tensile strength
40 – 45 MPa

First generation system with high thermal resistance designed for the production of hybrid and full-composite wheels by RTM and HP-RTM. The system is OEM qualified and has proven performance and reliability from several years of on-road service.

**Araldite® LY 1560 /
Aradur® 917-1 /
Accelerator DY 079**

Glass transition temperature (Tg)
195 – 205°C

Tensile strength
70 – 80 MPa

Second generation system with increased strength and toughness, plus high aesthetic properties for the most demanding wheel designs. Adjustable accelerator technology allows optimum fast-curing to be tailored to a given wheel design.

Araldite® composite solutions provide protection where fire resistance is required

Composite resin systems for battery housings

Araldite® solutions for battery housings are based on a unique halogen-free thermosetting chemistry meeting the fire resistance requirements of electric vehicles. Araldite® solutions are unfilled, fast-curing and offer low reaction exotherm, enabling fast and efficient production of composites parts by HP-RTM, WCM or DFCM, including even thick parts. High thermo-mechanical properties ensure battery cells are fully protected, whilst providing design freedom, light weight and corrosion resistance.

Our composite resin systems answer the need for all manufacturing processes. If you don't immediately find the product you need, you can contact your sales or technical representative for more information on:

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HP-RTM / WCM

**Araldite® FST 40004 /
Araldite® FST 40005**

UL 94 rating
GFRP 3.2 mm: V0
CFRP 2 mm: V1

Tensile strength
45 - 50 MPa

First generation halogen-free system, combining fire resistance and easy processing to enable efficient manufacture of large parts such as battery boxes with in-mold cure times as low as 5 min at 150°C.

**Araldite® FST 40004 /
Araldite® FST 40007**

UL 94 rating
GFRP 3.2 mm: V0
CFRP 2 mm: V0

Tensile strength
85 - 90 MPa

Second generation halogen-free solution with improved fire-resistance and structural properties, but without sacrificing the process and productivity attributes of the first generation product.

We value your challenge



With innovation

Every day, all over the world, our Technical Competence centers engage in intensive research and development focusing on one goal : to deliver innovative solutions by working hand-in-hand with our business partners. Together through a continual exchange of ideas, supported by an experienced team of sales and technical specialists, we strive to deliver innovative and regulatory compliant (eg REACH compliant) solutions.

We track both new market expectations and changing regulations. Protection of the environment, as well as health and safety are paramount concerns, playing an integral part in our development projects

With customer understanding

We market a unique product portfolio and a broad range of forward-looking solutions for our customers. Customers and partners benefit from an advanced level of service in:

- > product selection and quality
- > product trials in-house and with customers
- > customer seminars and trainings
- > technical service and solution-providing

Partnership with our customers is more than simply «putting them first». It requires long-term commitment to forging close relationships that create synergies of knowledge, security and adaptability to create a successful, shared future.

With care

Sustainability is a fundamental part of our corporate and business strategy. We see a better world in which our innovations help reduce consumption of natural resources and improve the quality of life for people everywhere. We are identifying the long-term trends that affect our markets and looking to see how products and applications can play a part in supporting and providing solutions to the challenges those markets face.

Huntsman Advanced Materials

Our Advanced Materials division is a leading global chemical solutions provider with a long heritage of pioneering technologically advanced epoxy, acrylic, phenolic and polyurethane-based polymer products.

Our capabilities in high-performance adhesives and composites, delivered by more than 1 600 associates, serve over 2 000 global customers with innovative, tailor-made solutions and more than 1 500 products which address global engineering challenges.

We operate synthesis, formulating and production facilities around the world



Enriching lives through innovation

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The Product may be or become hazardous. Buyer should (i) obtain Material Safety Data Sheets and Technical Data Sheets from Huntsman containing detailed information on Product hazards and toxicity, together with proper shipping, handling and storage procedures for the Product, (ii) take all steps necessary to adequately inform, warn and familiarize its employees, agents, direct and indirect customers and contractors who may handle or be exposed to the Product of all hazards pertaining to and proper procedures for safe handling, use, storage, transportation and disposal of and exposure to the Product and (iii) comply with and ensure that its employees, agents, direct and indirect customers and contractors who may handle or be exposed to the Product comply with all safety information contained in the applicable Material Safety Data Sheets, Technical Data Sheets or other instructions provided by Huntsman and all applicable laws, regulations and standards relating to the handling, use, storage, distribution and disposal of and exposure to the Product. Please note that products may differ from country to country. If you have any queries, kindly contact your local Huntsman representative.

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