MICHELIN

RESICARE

Beyond resin, innovation for life.



Araminolic resins for specialty applications.

Unique, **non-toxic**[1] and **renewable-carbon-based** resins offering high performance to compete with historical thermoset resins.

Textile reinforcement **Wood-based panels** **Insulators**

Composite materials **Molded compounds**

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Make a safer and preserved environment possible for future generations.

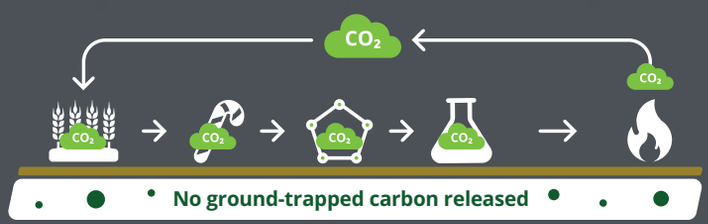
At **MICHELIN ResiCare**, we replace **traditional thermoset resins** derived from finite oil resources and associated with toxicity across the value chain with **innovative**, **bio-based** and **non-toxic[1] alternatives** that are **free from CMR[2] substances.**

SAFER CHEMICALS



NO FORMALDEHYDE
RESORCINOL, ISOCYANATES
PHENOL, BISPHENOLS, STYRENE

RENEWABLE CARBON



Benefits and characteristics

Solving toxicity issues in phenolic resins for your workers & offering regulatory peace of mind

REACH compliant

Monomers **free of formaldehyde** & **phenol** by design

Free of CMR and **endocrine disruptors**

Supports your company's sustainable development & sovereignty strategy

100% bio-based formulations[2]

Bio-based raw materials including **5HMF monomer**

Low CO_2 emissions[2]

Supports stable, resilient long-term sourcing strategies

European sourcing

Industrial demonstrators based in **France**

Advantages

No acute toxicity & serious health hazard pictograms VS **Formaldehyde, Phenol, Furfuraldehyde.**


Acute toxicity


Serious health hazard

(1) Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

(2) Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.

Araminolic resins: a unique alternative to phenolic thermoset resins.

Araminolic resins serve as **sustainable alternatives** to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde**, **resorcinol**, and **phenol** in adhesive applications.

Technical properties

- Mechanical resistance
- Thermal and flame resistance
- Ablation properties
- Rigidity properties
- Humidity resistance
- Chemical stability

Range of products

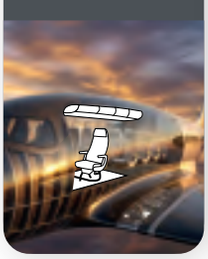
AEROSPACE & DEFENSE

Resi4 PREG

- Thermal protection
- Seat sandwich panel
- Trim panel

For pre-impregnated composites offering **FST properties.**

Certified **FAR25, EN45545,** and **UL 94V0.**



Resi4 C/C

- Heat exchanger
- Rocket nozzle
- Brake pad

For CMC composites offering **high thermal stability.**



Resi4 ABLATION

- Atmospheric re-entry bodies
- Propulsion nozzles
- Heat shields

For ablative protection offering **high thermal stability.**

High charring performance under heat flux.

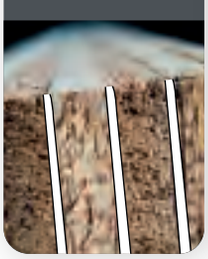


CONSTRUCTION

Resi4 PLYWOOD

- Plywood interior panel
- Construction panel
- Exterior panel

For Class 3 EN 314 plywood applications.



Resi4 MDF

- Furnitures
- Laminate corelayer
- Flooring

For MDF and **process panels,** offering **high moisture resistance**.



Resi4 INSULATION

- Natural & mineral fiber based insulation panels

For insulation applications and **meeting ACERMI criterias.**



TRANSPORTATION

Resi4 TEX

- Textile reinforcement
- PET, Recycled PET
- Nylon, Aramid, Rayon

For the textile industry, offering **high adhesive properties** and solving **toxicity issues in RFL solutions.**



Resi4 FRICTION

- Brake pads
- Clutch linings

For demanding brake pad applications.



Resi4 BELT

- Conveyor belts
- Mines & quarries
- Transmission belts

For belt and conveyor belt industries, offering **high adhesive properties** and solving **toxicity issues in RFL solutions.**



EPOXY

Resi4 EPOXY

- UV / Dual cure coatings
- Structural adhesives
- Composites

Exclusively for high value epoxy applications.



MONOMER

5-HMF

- Specialty polymers
- Surfactants
- Adhesives

5-HMF: a 100% bio-based and safe platform chemical.



MICHELIN

MICHELIN IS BUILDING A WORLD-LEADING MANUFACTURER OF LIFE-CHANGING COMPOSITES.

MICHELIN ResiCare contributes to this vision by developing non-toxic and bio-based thermoset resins for a wide range of composite applications.





MICHELIN RESICARE

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CERTIFICATION UTAC ISO 9001 UTAC CERAM

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Beyond resin, innovation for life.



AERONAUTICS & TRANSPORTATION

Resi4 PREG

A unique, **non-toxic**[1] & **renewable-carbon-based** araminolic resin engineered for pre-impregnated composites offering high thermal and FST properties.

Thermal protection **Internal security parts** **Trim panels**

Seat sandwich panels: Honeycomb and foam compatible

Battery casing

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Resi4 PREG

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 PREG is a unique, **bio-based**, **formaldehyde-free araminolic resin that is certified FAR25, EN45545, and UL 94V0** for pre-impregnated applications. Resi4 PREG replaces phenolics and is designed in accordance with REACH legislation. This renewable-carbon-based resin contributes to your company's sustainable strategy and petroleum resource independence.

Benefits and characteristics

FAR25 | EN45545 (HL3 R1) | UL94 V0

High thermal resistance for demanding applications in aeronautics

FAR25 certified (results on glass fiber 0,4 mm 2 ply)

Zero after-flame time

HRRmax: **35 kW/m²**

THR: **16 kW.min/m²**

Total concentration gasses **< 103 ppm**

Resin thermal resistance: **Tg = degradation temperature > 300°C**

Solving toxicity issues in phenolic resins for your workers & offering regulatory peace of mind

REACH compliant

Monomers **free of formaldehyde** and **phenol** by design

Free of CMR and **endocrine disruptors**

Bioethanol-solvent-based resin

Supports your company's sustainable development & sovereignty strategy

100% bio-based formulation[2]

Bio-based raw materials: **5HMF monomer**

Low CO_2 emissions[2]

European sourcing[2]

Advantages

No acute toxicity & serious health hazard pictograms VS **Formaldehyde, Phenol, Furfuraldehyde.**



Acute toxicity



Serious health hazard

Resi4 PREG
CO_2 emissions[2] (CO_2kg / kg)



[1]Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

[2]Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.



Technical Data Sheet

Product: Resi4 PREG. **Description:** solvent-based araminolic resin. **Presentation form:** dark-red liquid.

Benefits: formol-free, phenol-free, compatible with fiberglass, carbon, flax, aramid. Excellent thermal and flame resistance. Good char yield.

Main application: resin for prepregging process.

Prepregging process: liquid bath impregnation (foulard). Achievable impregnation from 30%w to 45%w resin.

Resin shelf life: 20 days at 20°C. 6 months at -18°C.

Handling precautions: This product must be used and disposed in accordance with the instructions in the Safety Data Sheet and in this technical datasheet. This product may stain the skin. Mixing the resin with strong acidic, oxidizing or reducing compounds is not recommended.

Destruction and disposal of liquid resin: Clean and rinse liquid resin mixture with water; hot water will help. Disposal with aqueous basic wastes.

Liquid resin characteristics

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	100 - 3000
Dry matter	Thermobalance	%	60 - 65
pH	pH meter	-	9 - 11
Density	Pycnometer	-	1,2
Duration of use at 20°C	Viscosity monitoring	Days	20

Cured resin characteristics

Flame resistance	FAR25, EN45545 HL3 and UL94V0 certified
Thermal resistance	Tg > 320°C
Char Yield	> 50%

Example of prepreg properties

300gsm 8 satin glass fabric 30%w Resi4 PREG resin – 90min @150°C 3Bars:

Property	Method	Unit	Measure
Cured ply thickness	Curing pressure 3Bars	mm	0.2
Flexural modulus	ISO14125	GPa	> 30
Flexural strength	ISO14125	MPa	> 500
ILSS	ISO14130	MPa	> 32

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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AEROSPACE & DEFENSE

Resi4 CARBON/CARBON

A unique, **non-toxic**[1] & **renewable-carbon-based** araminolic resin engineered for CMC composites offering high thermal stability.

Brake pad **Rocket nozzle** **Battery casing**
Industrial furnace component **Heat exchanger**

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Resi4 CARBON/CARBON

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 CARBON/CARBON is a unique, bio-based[2] and formaldehyde-free araminolic resin for CMC (ceramic matrice composites) produced via the PIP process (precursor infiltration and pyrolysis), with high thermal properties. This pre-carbon precursor is a new alternative to historical phenolic resins, developed according to REACH legislation.

Benefits and characteristics

High thermal performance

Coke rate[3] **> 55%**

Stability under temperatures up to 1200C°

Compatible with **impregnation** process

Compatible with **carbon fibers**

Solving toxicity issues in phenolics resins for your supply chain

Securing your long-term right to operate, independent of regulatory evolution

REACH compliant

Monomers **free of formaldehyde** & **phenol** by design

Free of CMR and **endocrine disruptors**

Water-based technology

Supporting your sovereignty, raw material procurement and sustainability strategies

100% bio-based formulation[2]

Bio-based raw materials: **5HMF monomer**

Low CO_2 emissions[2]

Advantages

No acute toxicity & serious health hazard pictograms VS **Formaldehyde, Phenol, Furfuraldehyde.**


Acute toxicity


Serious health hazard

Resi4 CARBON/CARBON CO_2 emissions[2] (CO_2kg / kg)



(1)Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

(2)Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.

(3)Coke rate – residu at 850°C > 50% (TGA – 10°C/min – nitrogen method).



Technical Data Sheet
Resi4 CARBON/CARBON

Product: Resi4 CARBON/CARBON.

Description: Aqueous aranolic resin.

Presentation form: Red - brown liquid.

Benefits: Formol-free, phenol-free formulation. High coke rate.

Main application: Carbon-Carbon composites with high thermal properties.

Main processing method: Impregnation.

Main cross-linking: Curing in an oven, pyrolysis.

Duration of use and storage: 15 days at room temperature. **Store in the freezer preferred** (6 months at -18°C). The viscosity can be adjusted by dilution in water or ethanol.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet.

Characteristics of liquid resin

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	160 - 250
Non-volatile matter	NF EN ISO 3251	Mass %	63 - 66
pH	pH meter	-	11 - 12
Density	-	-	1,25
Curing temperature	DSC	°C	Up to 220
Duration of use at 23°C	Viscosity monitoring	Days	15

Resin shaping

This resin system releases gases (mainly H2O and CO2) during curing, which can cause pressure build-up or porosity without a gas evacuation system. This system is therefore not recommended for closed mold processes. Open or semi-open processes are preferable.

Thermal performance of the resin

Property	Method	Unit	Measure
Coke rate at 950°C	ATG (10°C/min from 40°C to 950°C)	Mass %	55 - 58

Destruction and disposal: Cleaning of liquid resin with water. Disposal with basic aqueous waste.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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AEROSPACE & DEFENSE

Resi4 ABLATION

A unique, **non-toxic**[1] & **renewable-carbon-based**, araminolic resin engineered for ablative protection offering high charring performance under heat flux.

Atmospheric re-entry bodies **Heat shields** **Propulsion nozzles**
Fuselage structure parts **Thermal protection**

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Resi4 ABLATION

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 ABLATION is a unique, bio-based[2] and formaldehyde-free araminolic resin with high temperature properties. While reducing use of CMR substances in your value chain, Resi4 ABLATION contributes to your sustainable roadmap, achieving CO_2 emission reduction & sovereignty goals with local sourcing.

Benefits and characteristics

High temperature resistance for aerospace and defense applications

Coke rate[3] **50% - 55%**

Solving toxicity issues in phenolics resins for your supply chain

Securing your long-term right to operate, independent of **regulatory evolution**

REACH compliant

Monomers **free of formaldehyde** and **phenol** by design

Free of CMR and **endocrine disruptors**

Water-based technology

Supporting your sovereignty, raw material procurement and sustainability strategies

100% bio-based formulation[2]

Bio-based raw materials: **5HMF monomer**

Low CO_2 emissions[2]

European sourcing[2]

Advantages

No acute toxicity & serious health hazard pictograms VS **Formaldehyde, Phenol, Furfuraldehyde.**


Acute toxicity


Serious health hazard

Resi4 ABLATION
CO_2 emissions[2] (CO_2kg / kg)



(1)Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

(2)Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.

(3)Coke rate – residu at 850°C > 50% (TGA – 10°C/min – nitrogen method).



Technical Data Sheet Resi4 ABLATION

Applications:

- Atmospheric re-entry bodies
- Heat shields
- Propulsion nozzles
- Fuselage structure parts

Product: Resi4 ABLATION.

Description: Aqueous araminolic resin.

Presentation form: Red - brown liquid.

Benefits: Formol-free, phenol-free formulation. High coke rate.

Main application: Molded composites with high thermal stability.

Main method of implementation: Fiber impregnation, drying to evaporate the solvent (water), then thermocompression molding. The drying time and curing conditions during molding will need to be adapted to the product.

Main cross-linking: Thermocompression.

Duration of use and storage: 10 days at room temperature and 30 days at 4°C (Viscosity < 1500cP). Store in the freezer to extend shelf life (until 6 months). The viscosity can be adjusted by dilution in water or ethanol.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet.

Characteristics of liquid resin

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	200 - 400
Dry matter	Moisture Analyzer – 100°C	%	50 - 52
pH	pH meter	-	11 - 12
Density	Pycnometer	-	1,25
Onset crosslinking	DSC – 10°C/min	°C	100 - 110
Peak temperature crosslinking	DSC – 10°C/min	°C	130 - 150
Enthalpy	DSC – 10°C/min	J/g	200 - 350
Coke rate – residu at 850°C	TGA – 10°C/min – nitrogen	%	> 50

Cross-linking method: The curing conditions must be adapted according to the size, geometry and composition of the piece.

Destruction and disposal: Cleaning of liquid resin with water. Disposal with basic aqueous waste.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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Beyond resin, innovation for life.



BUILDING, TRANSPORTATION & FURNITURE

Resi4 PLYWOOD

A unique, **non-toxic**[1] & **renewable-carbon-based** araminolic resin engineered for Class 3 EN 314 plywood applications.

Plywood interior panel **Construction panel** **Exterior panel**
Boating structure **Technical structure** **Furniture**
Flooring **and more...**

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Resi4 PLYWOOD

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Switch to **Resi4 PLYWOOD**: a formaldehyde-free araminolic resin that is safe[1], biobased[2] and high-performing for Class 3 EN314 plywood. Compatible with your current production processes, favored by your workers, and made of renewable carbon, let it become your contribution to the European Green Deal, while keeping plywood performance.

Benefits and characteristics

Class 3 EN 314

100% renewable carbon and low CO_2

100% bio-based formulation[2]

Towards low **CO_2 emissions**

Contributing to **European Green Deal** and **RE2020**

Building European Sourcing[2]

No SVHC[1] by design for long term safety

REACH compliance

Monomers **free of Formaldehyde**, **Phenol** & **Melamine** by design[1]

Ahead of **air quality** performance

No more **CMR pictograms** nor **endocrine disruptors**

No **regrettable** substitution

Water-based technology

High adhesive performance - Class 3

Meets **Class 3** requirements according to **EN 314 standard**

Engineered for existing production process

Longer **shelf life**

Compatible with **water-based** cleaning systems

Favored by **your operators** and a point of pride for the whole team

Advantages

No molecule with acute toxicity & serious health hazard. Formaldehyde, phenol and **melamine free.**



Acute toxicity



Serious health hazard

Resi4 PLYWOOD CO_2 emissions[2] (CO_2kg / kg)



(1)Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

(2)Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.

Technical Data Sheet

Product: Resi4 PLYWOOD. **Description:** A two-component aqueous araminolic resin.

Presentation form: A liquid resin in amber color, non-crosslinked – dark brown crosslinked, and a bio-based hardener in white powder form.

Benefits: Formulation free of formaldehyde, phenol, and melamine; compatible with most fillers used by manufacturers in the sector. Physicochemical properties essential for EN314-3 Class 3 classification. Easy to clean with water.

Main application: Hardwood plywood (eg. birch, poplar), tropical wood (eg. okoume), veneers from 1 to 3 mm thick.

Main processing method: Roller gluing. **Main cross-linking:** Thermocompression.

Duration of use and storage: Up to 150 days at 20°C. Store between 1 and 25°C.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet.

Characteristics of liquid resin

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	200 - 500
Solid content	Moisture analyzer	%	40 - 45
pH	pH meter	-	8 - 11
Curing temperature	-	°C	100 -150 at core
Shelf life of resin alone at 20°C	Viscosity monitoring	Days	Up to 150
Shelf life of hardener at 20°C	-	-	< 1 year when stored in a dry place

Features of the fillers kit: Formulation compatible with mineral fillers such as “chalk” type and vegetable fillers such as “olive pomace” type at a level of 10 to 35% in the glue mix. A “ready-to-use” ResiCare fillers kit is available for purchase if required.

Adhesive characteristics (Resin + Hardener + Filler)

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield viscometer	mPa.s	1000 – 5000
pH	pH meter	-	7 - 9
Pot life of glue (resin + hardener + fillers) at 23°C	Viscosity monitoring	Hour	1
Process setpoint temperature	-	°C	115 – 130
Curing time (9-15mm 7-ply)	-	Minutes	10 - 20

Recommendations and precautions: compatible with industrial panel curing conditions. The following characteristics are adjustable: viscosity, pH, reactivity. Mixing with acidic compounds, oxidizing compounds, or reducing compounds is not recommended. Shake before use.

Destruction and disposal of liquid resin: Clean and rinse liquid resin mixture with water; hot water will help. Disposal with aqueous basic wastes.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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BUILDING & FURNITURE

Resi4 WOOD

A unique, non-toxic[1] & renewable-carbon-based araminolic resin engineered for MDF and process panels, offering high moisture resistance.

Furniture **Flooring** **Laminate corelayer** **Doors** **Sandwich panels**

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Resi4 WOOD

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 WOOD is a unique, araminolic resin for **generic process panels** aligned with **EN 622-5 MDF HLS** guidelines (moisture resistance). It is a new alternative to historical **Phenolic** and **Melamine Urea Formaldehyde** resins, developed according to REACH legislation for worker safety.

Benefits and characteristics

High moisture resistance[3] and optimized formulation for furniture and building

Meets requirements according to **EN 622-5 MDF HLS standard**

Moisture resistance: > 0,25 N/mm2 after cyclic conditions according to EN 317 standard for 12 mm board

Curing time: 17s / mm

Odorless board: 8/10 on a panel list[4]

Solving toxicity issues in PF / MUF resins for your workers & offering regulatory peace of mind

REACH compliant

Monomers **free of formaldehyde** on the final product (7 µg/ m3 after 24H, 8 µg/m3 after 48H)[5]

Free of CMR 1 & 2 and **endocrine disruptors**

Water-based resin

Supports your company's sustainable development strategy

Approaching >85% bio-based formulation[2]

Bio-based raw materials: **5HMF monomer**

Low CO_2 emissions[2]

Advantages

No serious health hazard pictograms VS **Formaldehyde, Phenol** and **Melamine.**



Serious health hazard

Resi4 WOOD CO_2 emissions[2] (CO_2kg / kg)



(1)*Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.*

(2)*Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.*

(3)*Moisture resistance: Meets Class 3 requirements according to EN 314 standard.*

(4)*Odor evaluation according to DIN ISO 16000-28.*

(5)*Chamber emission measures realize according to ISO 16000-3:2023-12.*



Technical Data Sheet

Product: Resi4 WOOD. **Description:** Aqueous araminolic resin. **Presentation form:** Red - brown liquid.

Benefits: Formol-free, phenol-free, melamine-free. Resistance to humidity.

Main application: MDF & HDF from 1 to 22 mm thick. From 650 to 1100 kg/m3.

Main processing method: Spraying. **Main cross-linking method:** Thermocompression.

Duration of use and storage: Up to 20 days at 20°C. Up to 60 days at 5°C.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet. This product may stain the skin.

Characteristics of liquid resin:

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	100 - 500
Dry matter	Thermobalance	Mass %	58 - 61
pH	pH meter	-	7 - 9
Cross-linking temperature	DSC	°C	148
Duration of use at 20°C	Viscosity monitoring	Days	20
Density	Gas pycnometry	g/cm3	1,24
Use temperature	Thermometer	°C	20 - 40

Catalyst:

Nature	Quantity	Effect
Ammonium salts in water solution	0,5 - 3 % of resin weight	Up 3-time-shorter curing time, increase water resistance

Characteristics of 0,8 g/cm3, MDF 12 mm panel:

Property	Method	Unit	Measure
Pressing time	Hot press	s/mm	17
Pressing temperature	Press temperature control	°C	160 – 220
IB	EN 622-5	MPa	Up to 1,0
Swelling	EN 622-5	Thickness %	< 8
MOE	EN 622-5	MPa	Up to 4000
MOR	EN 622-5	MPa	Up to 55
Cycling test	EN 622-5	MPa	Up to 0,3

Recommendations and precautions: It is not recommended to mix with acids. Shake before use. Dephase below 20 °C pre-heat >= 20 °C and stir before use.

Destruction and disposal: Disposal with water-based solutions.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

The information presented in this document, intended for explanatory purposes only, is based on our technical and scientific knowledge and on the literature available at the date of publication. None of the information contained herein should be construed as a warranty or representation by the manufacturer, nor as an infringement of existing patents. The manufacturer accepts no responsibility for the information provided.

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Beyond resin, innovation for life.



BUILDING & CONSTRUCTION

Resi4 INSULATION

A unique, non-toxic[1] & renewable-carbon-based araminolic resin engineered for insulation applications and meeting ACERMI criterias.

Natural & mineral fiber based insulation panels

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Resi4 INSULATION

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 INSULATION is a unique, araminolic resin for **mineral and natural insulation,** whether **glass fiber, rock fiber** or **wood fiber,** for both **flexible and rigid panels**. These resins are designed to be non-toxic, SVHC-free[1] and 100% bio-sourced, making them particularly well-suited to the needs of construction and energy renovation. It is a new alternative to historical **formo-phenolic resins** and **isocyanate resins.**

Benefits and characteristics

Requested ACERMI performances for your construction industry are achieved

Compatible with water-based cleaning systems

Compressive strength (10%)[3] = [50 to 70] kPa

Tensile strength[3] = [10 to 16]kPa

Water absorption[3] < 1kg/m²

Solving toxicity issues in PUF / PMDI solutions for your workers & offering regulatory peace of mind

REACH compliant

Monomers **free of formaldehyde and isocyanates** by design

Free of CMR 1 & 2 and **endocrine disruptors**

Water-based resin

Supports your company's sustainable development strategy and green building certification

Approaching 100% bio-based formulation[2]

Bio-based raw materials: **5HMF monomer**

Aligned with RE2020

Low CO_2 emissions[2]

Advantages

No acute toxicity & serious health hazard pictograms VS **Formaldehyde, Phenol, Furfuraldehyde.**



Acute toxicity



Serious health hazard

Resi4 INSULATION CO_2 emissions[2] (CO_2kg / kg)



(1)Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

(2)Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing.

(3)For pannel density of 120 kg/m3.

Technical Data Sheet

Product: Resi4 INSULATION.

Description: Aqueous araminolic resin.

Presentation form: Brown-orange liquid.

Benefits: Formaldehyde-free, phenol-free formulation, compatible with additives commonly used by industry professionals.

Key Physico-Chemical Properties of the Application:

- Flexion, compression, spring back, etc.
- Moisture resistance
- Conductivity

Main application: mineral fiber insulation, 40 to 200 mm thick, 30 to 100 kg/m^3.

Main processing method: spraying, thermo-compression.

Usage and storage duration: : 30 days at 20°C up to 700 cP. > 3 months at 5°C. Store between 1 and 25°C.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet.

Characteristics of liquid resin:

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Rheometer	mPa.s	150 - 700
Dry matter	Mettler Thermobalance	%	Up to 55
pH	Mettler pH meter	-	7 - 9
Curing temperature	High-pressure DSC and oven	°C	80 - 225
Usage duration at 23°C	Viscosity monitoring	Days	30 up to 700 cP

Recommendations and precautions:

- The following characteristics are adaptable: viscosity, pH and reactivity.
- It is possible to heat the solution (< 40°C) to reach the target spraying viscosity.
- Perform preliminary spraying tests with the existing spraying process.
- It is not recommended to mix with acidic compounds, oxidizing compounds, or reducing compounds.
- Could be stirred before use.

Destruction and disposal: Disposal with water-based solutions.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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RESICARE

Beyond resin, innovation for life.



TRANSPORTATION

Resi4 TIRE

A unique, non-toxic-based araminolic resin[1] for the tire industry, offering high adhesive properties & solving toxicity issues in RFL solutions.

Resin for dipping solution for textile reinforcement

PET **RPET** **Nylon** **Aramid** **Rayon** **Tires**

MICHELIN

Resi4 TIRE

Araminolic resins serve as a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace formaldehyde, resorcinol, and phenol in adhesive applications.

Resi4 TIRE is a next generation, phenolic novolac resin developed for tire textile applications. Fully qualified by **MICHELIN** for adhesive resistance across all fiber types, it delivers the same level of performance with no changes to existing industrial processes. Approaching a formulation that is over **50% biobased**[2] and **100% non-toxic**[1], Resi4 TIRE offers a safe, sustainable alternative to traditional phenolic resins, free from CMR substances and endocrine disruptors, fully REACH-compliant, and designed to protect workers without compromising performance.

Benefits and characteristics

Plug & play technology qualified by MICHELIN

No reformulation needed and keep your know-how on your dipping solution.
1-for-1 replacement of RF resins: same chemical family.
Preserves your latex-compound specificity.

Equivalent **adhesion performance** to RFL-treated fabrics (fatigue, peel, green adhesion, stiffness).
Multi-fiber compatibility: PET, RPET, Nylon 6/66, Rayon, Aramid.

No process changes: same curing conditions (time, temperature, tension).
Progressive integration: can run alongside RFL systems. No need for full switch.
Compatible with **multiple rubber compounds.**

Solving toxicity issues in RFL solutions & offering regulatory peace of mind

Resi4 TIRE enhances operator safety by **avoiding CMR pictograms** and **endocrine disruptors.**

Fully **REACH-compliant formulation.**

Formulated without **formaldehyde**, **resorcinol**, **isocyanates, and epoxy** by design.

Free to operate

Absolute **freedom** to design **your own glue.**

Global sourcing: suppliers in both Asia and Europe.

Business continuity secured: dual sourcing strategy validated by a leading tire manufacturer.

Advantages

- **No acute toxicity & serious health hazard pictograms** vs **Formol.**


Acute toxicity


Serious health hazard

- **Strong Business Continuity Management** (BCM).

Technical Data Sheet
Resi4 TIRE

Applications:

Resin for dipping solution for textile reinforcement

PET | RPET | Nylon | Aramide | Rayon | Tires

Product: Resi4 TIRE

Description: Aqueous araminolic resin, Novolac type intended to replace historically used Resorcinol/Formaldehyde resins for bonding rubbers to textile reinforcements.

Presentation form: Brown liquid

Benefits: Formaldehyde-free, resorcinol-free, isocyanate-free. Identical performance to Resorcinol-Formaldehyde (RF) resins. No modification of formulations and bonding conditions.

Resi4 TIRE is compatible with latexes and additives available on the market to produce the RFL adhesive system (Resorcinol/Formaldehyde/Latex).

Main application: Bonding of textile reinforcements (Polyester, nylon, aramid, rayon) for rubber applications.

Main processing method: Impregnation

Usage and Storage Duration: After activation, Resi4 TIRE's shelf life is more than 12 hours if stored between 5°C and 30°C. As soon as the Resi4 TIRE is mixed with the latexes, the shelf life is like a standard RFL (between 3 days and 30 days).

Skid and pods: To produce the resin in the best conditions, ResiCare recommends using a Skid4 TEX. The Skid4 TEX is an equipment that allows the resin to be manufactured in-situ. This equipment, combined with Pod4 TEX (ready-to-use powder solution), enables the production of liquid resin in an aqueous phase.



Pod4 TEX
Monomer in powder



Skid4 TEX
Resinification



Resi4 TIRE

This liquid resin can then be mixed with different types of latexes (natural rubber latex-NR, Styrene/Butadiene dispersion-SBR, Styrene/Butadiene/Vinyl Pyridine dispersion VP, Acrylonitrile/Butadiene dispersion - NBR, Chloroprene dispersion- CR) to produce the glue with customer formulations.

Handling Precautions: This product must be used in accordance with the instructions from the Pod4 TEX and Resi4 TIRE Safety Data Sheet.

Liquid resin characteristics

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	1.95 - 4
Solid content	Thermobalance	%	8.30 - 8.80
pH at 20°C	pH meter	-	7.7 - 8.7

Generic adhesive characteristics

Adhesive: It is recommended to add the resin into the latex used by the customer. The insertion temperature of the resin into the latex should be between 10 and 30°C under mixing. Depending on the type of latex used, an adjustment may be necessary (e.g., pH).

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	< 10
Solid content	Thermobalance	%	15 - 25
pH at 20°C	pH meter	-	9 - 11
Temperature/ Curing Time	-	-	Similar to RF resins

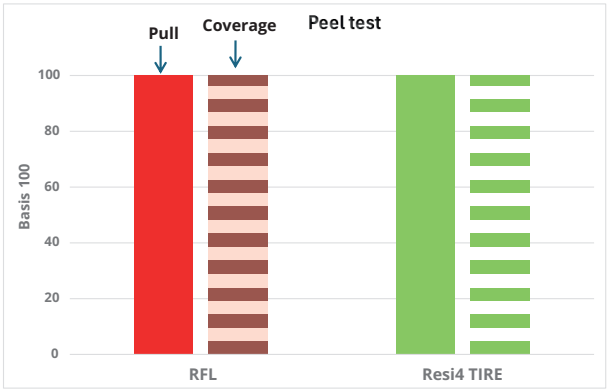
Adhesive performance

Iso performance RF / Resi4 TIRE on different reinforcement sizes.

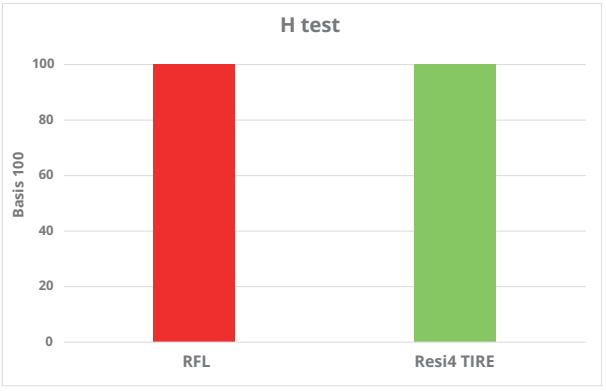
Adhesive performance on PET

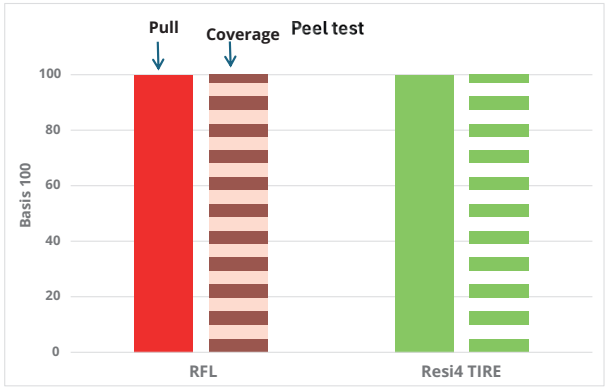
H test: tensile test
Force and peeling appearance.



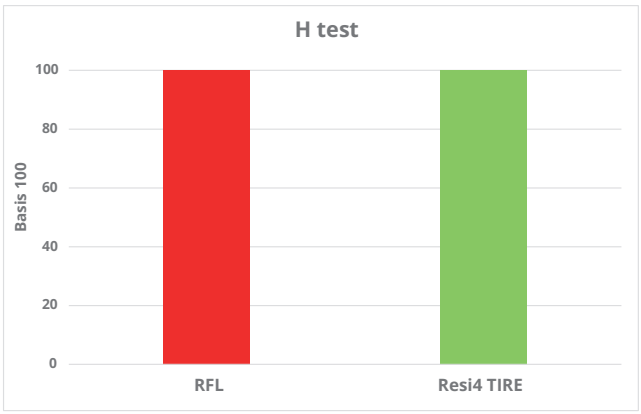


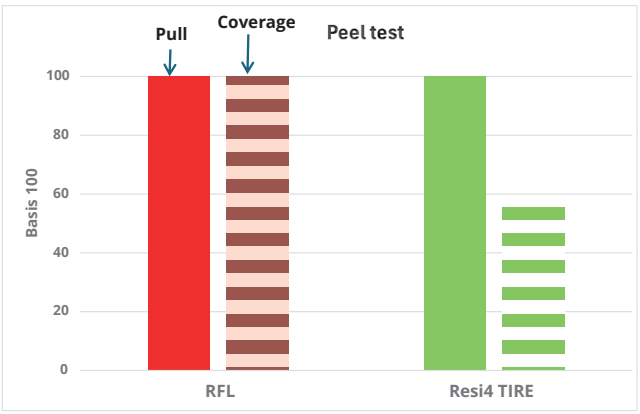
Adhesive performance on Nylon



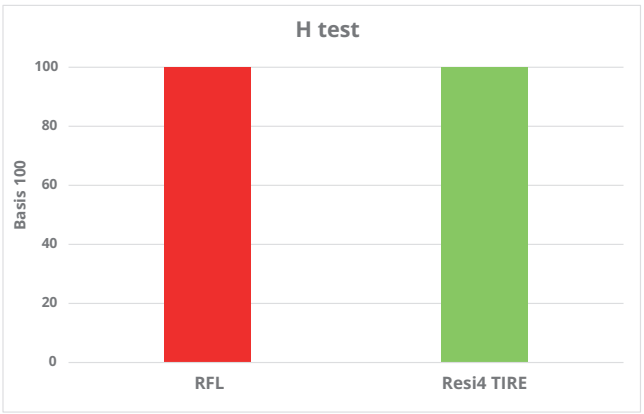


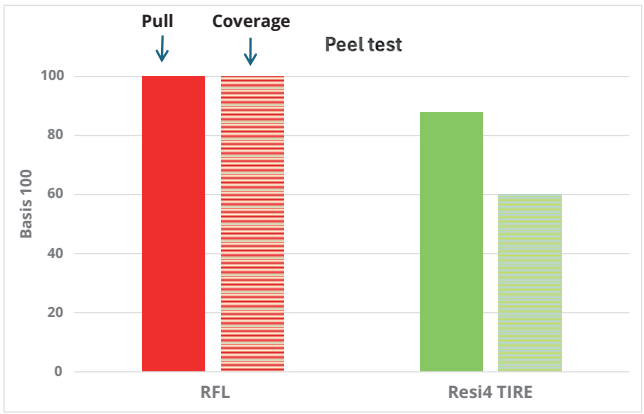
Adhesive performance on Rayon



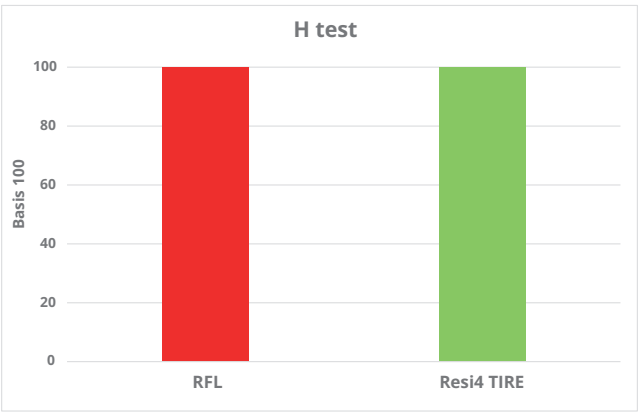


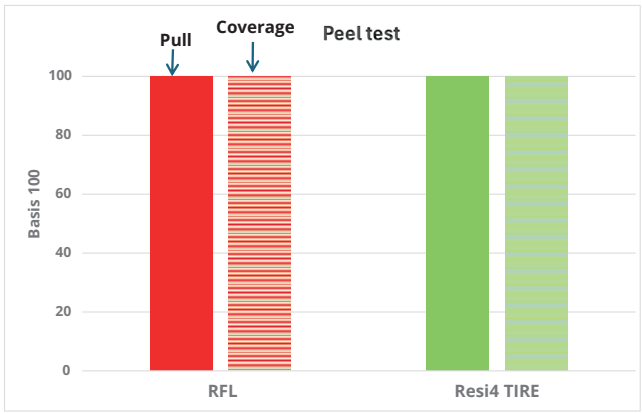
Adhesive performance on Aramid



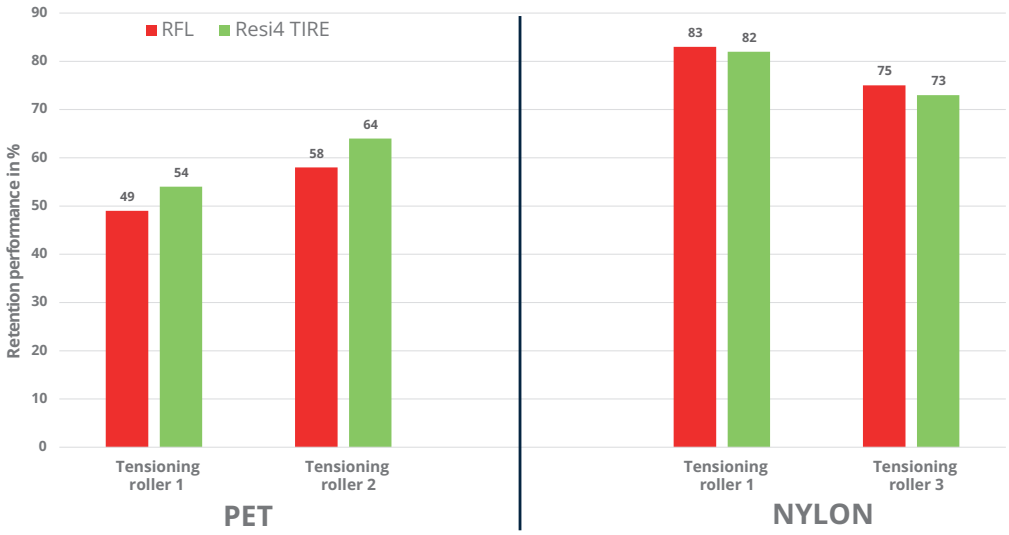


Adhesive performance on RPET



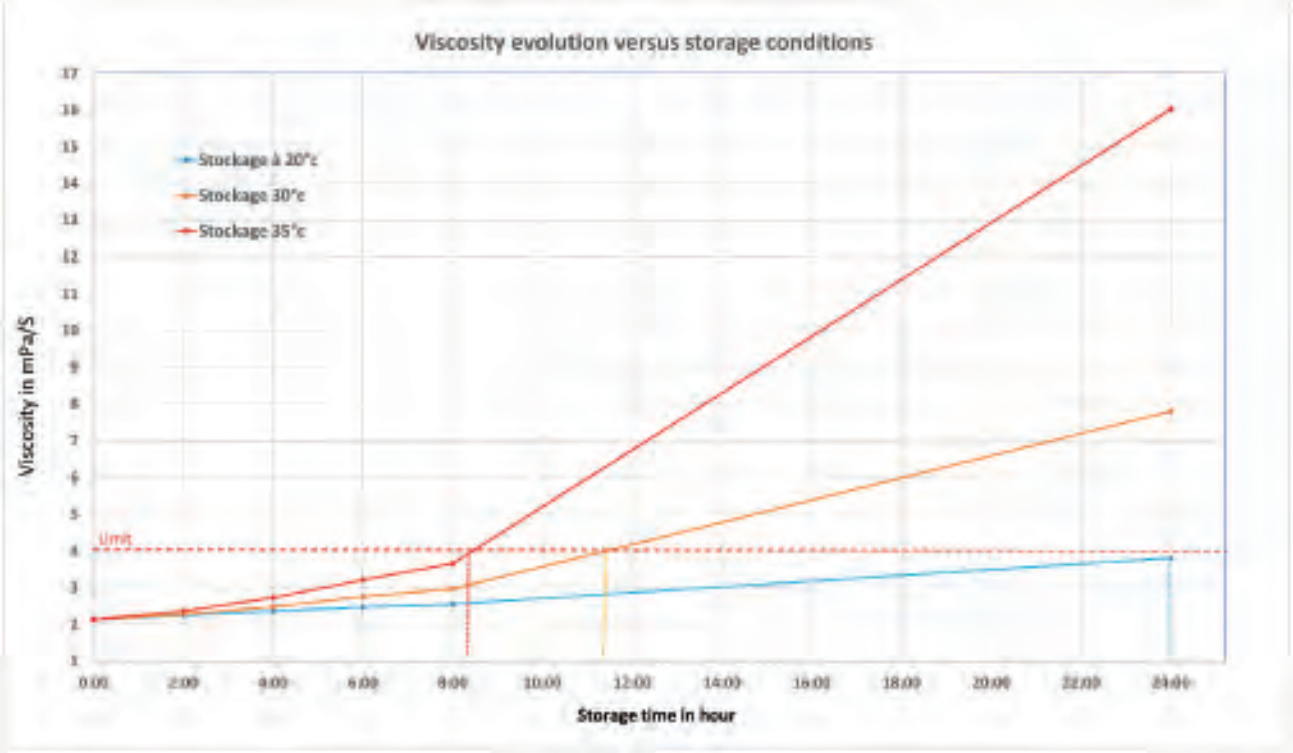


Shoe shine test (Endurance test) on PET and NYLON



Recommendations and Precautions

Resin: The Resi4 TIRE's shelf life is highly dependent on the storage temperature.



Disposal and evacuation: Disposal with basic water-based solutions.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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Key figures

40kT
fabrics dipped with ResiCare resins

200M+
tires produced with Resi4 TIRE

40+
patents

15 years
of adhesion expertise

3
continents

Already working with us: INDORAMA VENTURES · HALEAD · HS HYOSUNG

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Beyond resin, innovation for life.



AUTOMOTIVE, 2 WHEELS

Resi4 FRICTION

A unique, non-toxic[1], renewable-carbon-based araminolic resin engineered for demanding brake pad applications.

Brake pads **Clutch linings**

MICHELIN

Resi4 FRICTION

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 FRICTION is a unique, **bio-based**, **formaldehyde-free and hexamine-free araminolic resin** for friction applications. Resi4 FRICTION replaces phenolics and is designed in accordance with REACH legislation. This renewable-carbon-based resin contributes to your company's sustainable strategy and petroleum resource independence.

Benefits and characteristics

Characteristics demanded for brake pad performance

Flow distance: 15 - 20mm (ISO8619:2003)

B-time: 40 - 80 sec (ISO 8987 / 150°C)

Coke rate: 50 - 55%

Particule size: D50 < 25 µm

Solving toxicity issues in phenolic resins for your workers & offering regulatory peace of mind

REACH compliant

Monomers **free of formaldehyde** and **hexamine** by design

Free of CMR and **endocrine disruptors**

Supports your company's sustainable development strategy

Approaching >85% bio-based formulation[2]

Bio-based raw materials: **5HMF monomer**

Low CO_2 emissions[2]

Advantages

No acute toxicity & serious health hazard pictograms VS **Formaldehyde** and **Phenol.**



Acute toxicity



Serious health hazard

Resi4 FRICTION CO_2 emissions[2] (CO_2kg / kg)



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Technical Data Sheet
Resi4 FRICTION

Applications:

Brake pads | Clutch linings

Product: Resi4 FRICTION.

Description: araminolic resin.

Presentation form: red-brown powder.

Benefits: formol-free, phenol-free, hexamine-free formulation.

Main application: brake pads.

Main cross-linking mode: thermocompression.

Duration of use and storage: data in progress (>4 months) – stored at room temperature.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet.

Powder resin characteristics

Property	Method	Unit	Measure
Flow distance	ISO 8619:2003	mm	15 - 20
Humidity	Karl Fisher	%	3 - 4
Onset cross-linking temperature	DSC – Ramp 10°C/min	°C	115 - 125
Peak cross-linking temperature	DSC – Ramp 10°C/min	°C	135 - 145
Particule size	Malvern	µm	D50 < 25 D90 < 75
B-Time	ISO 8987 / 150°C	sec	40 - 80
Coke rate – residu at 850°C	TGA – Ramp 10°C/min – Nitrogen	%	> 50

Destruction and disposal: Cleaning of powder resin with water. Disposal with basic aqueous waste.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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INDUSTRY, MINES & QUARRIES

Resi4 BELT

A unique, non-toxic-based araminolic resin[1] for belt and convoyer belt industries, offering high adhesive properties & solving toxicity issues in RFL solutions.

Resin for dipping solution for textile reinforcement

PET **RPET** **Nylon** **Aramid** **Conveyor belt** **Belt**

MICHELIN

Resi4 BELT

Araminolic resins provide a sustainable alternative to conventional thermosetting phenolics, formulated with unique, bio-based monomers that replace **formaldehyde** with **aromatic aldehydes** and **polyphenols.**

Resi4 BELT is a next generation, phenolic novolac resin developed for tire textile applications. Approaching a formulation that is over **50% biobased**[2] and **100% non-toxic**[1], Resi4 BELT offers a safe, sustainable alternative to traditional phenolic resins, free from CMR substances and endocrine disruptors, fully REACH-compliant, and designed to protect workers without compromising performance.

Benefits and characteristics

Plug & play technology

No reformulation needed and keep your know-how on your dipping solution.
1-for-1 replacement of RF resins: same chemical family.
Preserves your latex-compound specificity.

Equivalent **adhesion performance** to RFL-treated fabrics (fatigue, peel, green adhesion, stiffness).
Multi-fiber compatibility: PET, RPET, Nylon 6/66, Aramid.

No process changes: same curing conditions (time, temperature, tension).
Progressive integration: can run alongside RFL systems. No need for full switch.
Compatible with **multiple rubber compounds.**

Solving toxicity issues in RFL solutions & offering regulatory peace of mind

Resi4 BELT enhances operator safety by **avoiding CMR pictograms** and **endocrine disruptors.**

Fully **REACH-compliant formulation.**

Formulated without **formaldehyde**, **resorcinol**, **isocyanates** by design.

Free to operate

Absolute **freedom** to design **your own glue.**

Global sourcing: suppliers in both Asia and Europe.

Business continuity secured: dual sourcing strategy validated by a leading tire manufacturer.

Advantages

No acute toxicity & serious health hazard pictograms vs **Formol.**


Acute toxicity


Serious health hazard

Strong Business Continuity Management (BCM).

(1)Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

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Technical Data Sheet
Resi4 BELT

Applications:

Resin for dipping solution for textile reinforcement

PET | RPET | Nylon | Aramid | Conveyor belt | Belt

Product: Resi4 BELT

Description: Aqueous araminolic resin, Novolac type intended to replace historically used Resorcinol/Formaldehyde resins for bonding rubbers to textile reinforcements.

Presentation form: Brown liquid

Benefits: Formaldehyde-free, resorcinol-free, isocyanate-free. Identical performance to Resorcinol-Formaldehyde (RF) resins. No modification of formulations and bonding conditions.

Resi4 BELT is compatible with latexes and additives available on the market to produce the RFL adhesive system (Resorcinol/Formaldehyde/Latex).

Main application: Bonding of textile reinforcements (Polyester, nylon, aramid, rayon) for rubber applications.

Main processing method: Impregnation

Usage and Storage Duration: After activation, Resi4 BELT's shelf life is more than 12 hours if stored between 5°C and 30°C. As soon as the Resi4 BELT is mixed with the latexes, the shelf life is like a standard RFL (between 3 days and 30 days).

Skid and pods: To produce the resin in the best conditions, ResiCare recommends using a Skid4 TEX. The Skid4 TEX is an equipment that allows the resin to be manufactured in-situ. This equipment, combined with Pod4 TEX (ready-to-use powder solution), enables the production of liquid resin in an aqueous phase.



Pod4 TEX
Monomer in powder



Skid4 TEX
Resinification



Resi4 BELT

Handling Precautions: This product must be used in accordance with the instructions from the Pod4 TEX and Resi4 BELT Safety Data Sheet.

Liquid resin characteristics

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	1.95 - 4
Solid content	Thermobalance	%	8.30 - 8.80
pH at 20°C	pH meter	-	7.7 - 8.7

Generic adhesive characteristics

Adhesive: It is recommended to add the resin into the latex used by the customer. The insertion temperature of the resin into the latex should be between 10 and 30°C under mixing. Depending on the type of latex used, an adjustment may be necessary (e.g., pH).

Property	Method	Unit	Measure
Viscosity at 20°C	Brookfield Viscometer	mPa.s	< 10
Solid content	Thermobalance	%	15 - 25
pH at 20°C	pH meter	-	9 - 11
Temperature/ Curing Time	-	-	Similar to RF resins

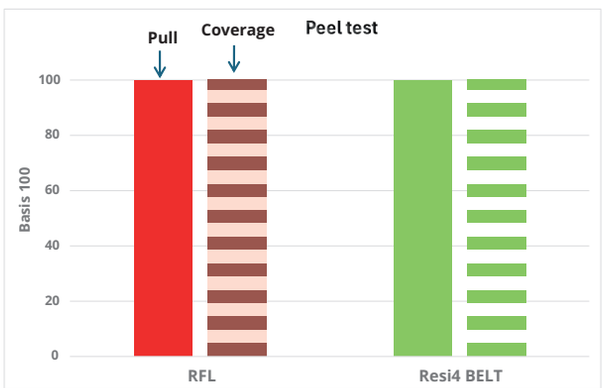
Adhesive performance

Iso performance RF / Resi4 BELT on different reinforcement sizes.

Adhesive performance on PET

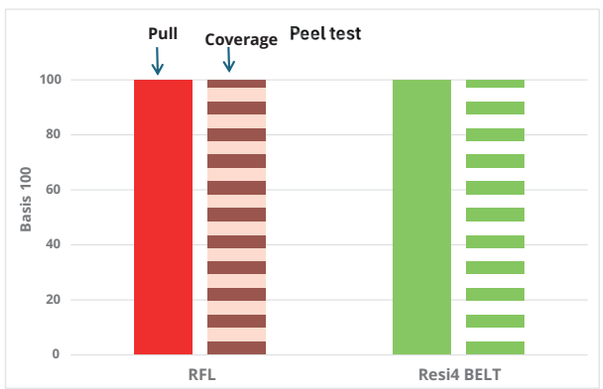
H test: tensile test
Force and peeling appearance.





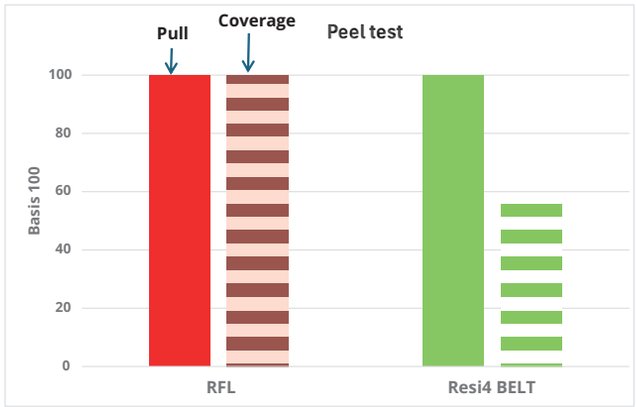
Adhesive performance on Nylon



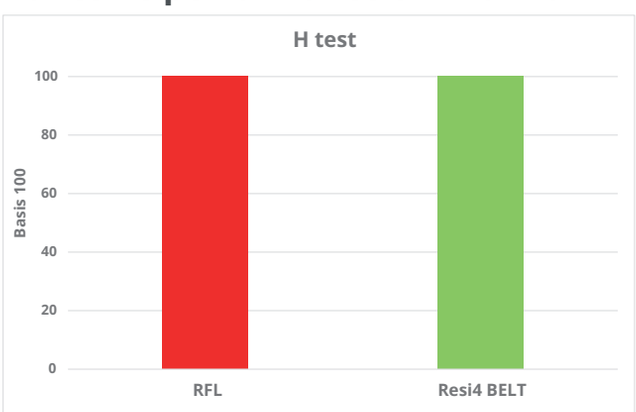


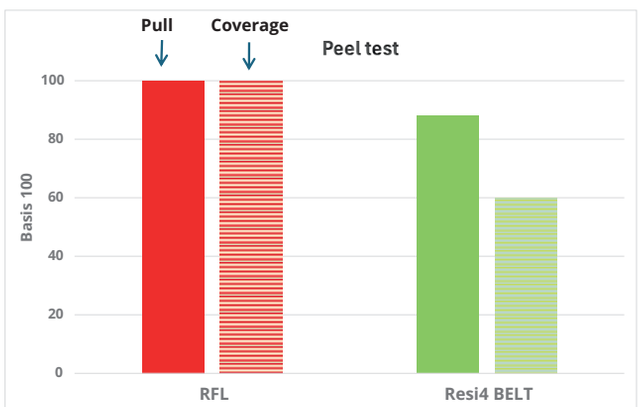
Adhesive performance on Rayon



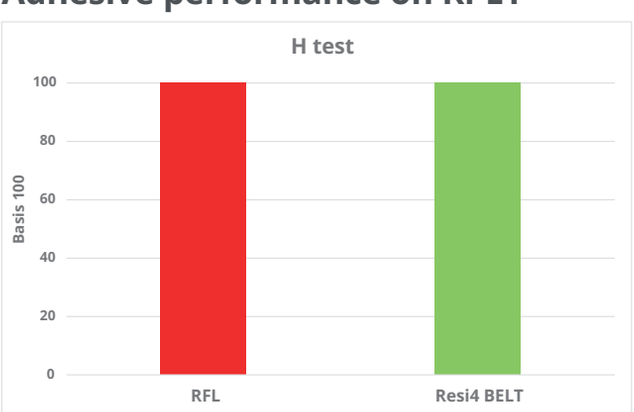


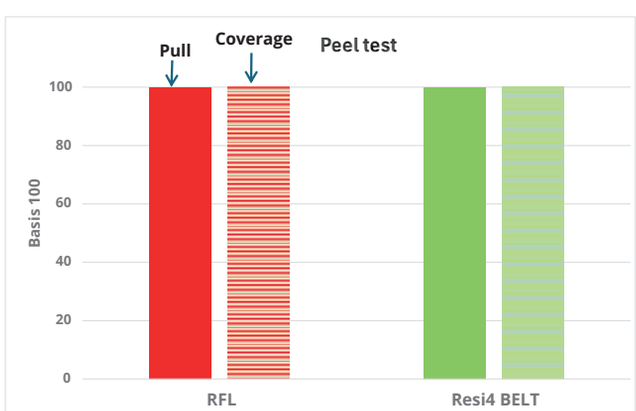
Adhesive performance on Aramid



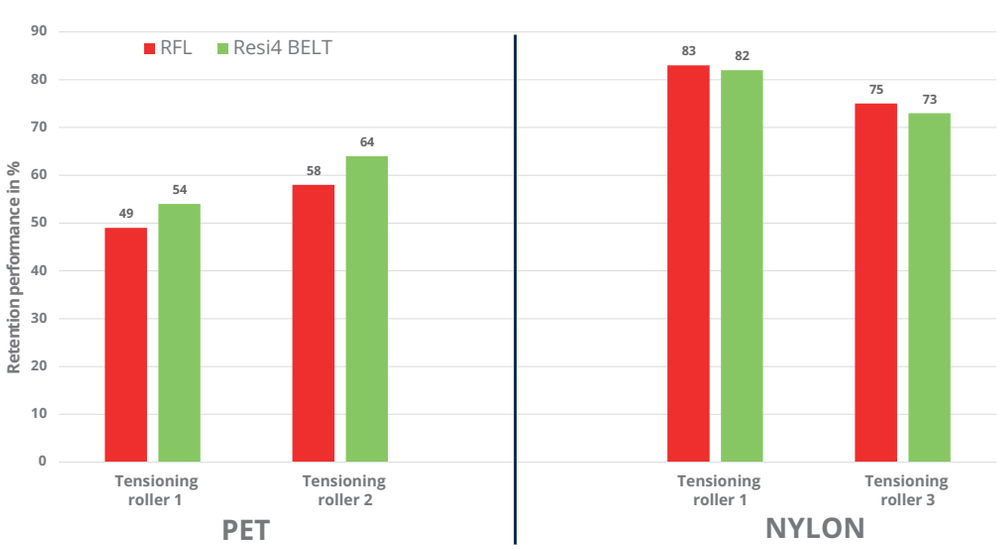


Adhesive performance on RPET



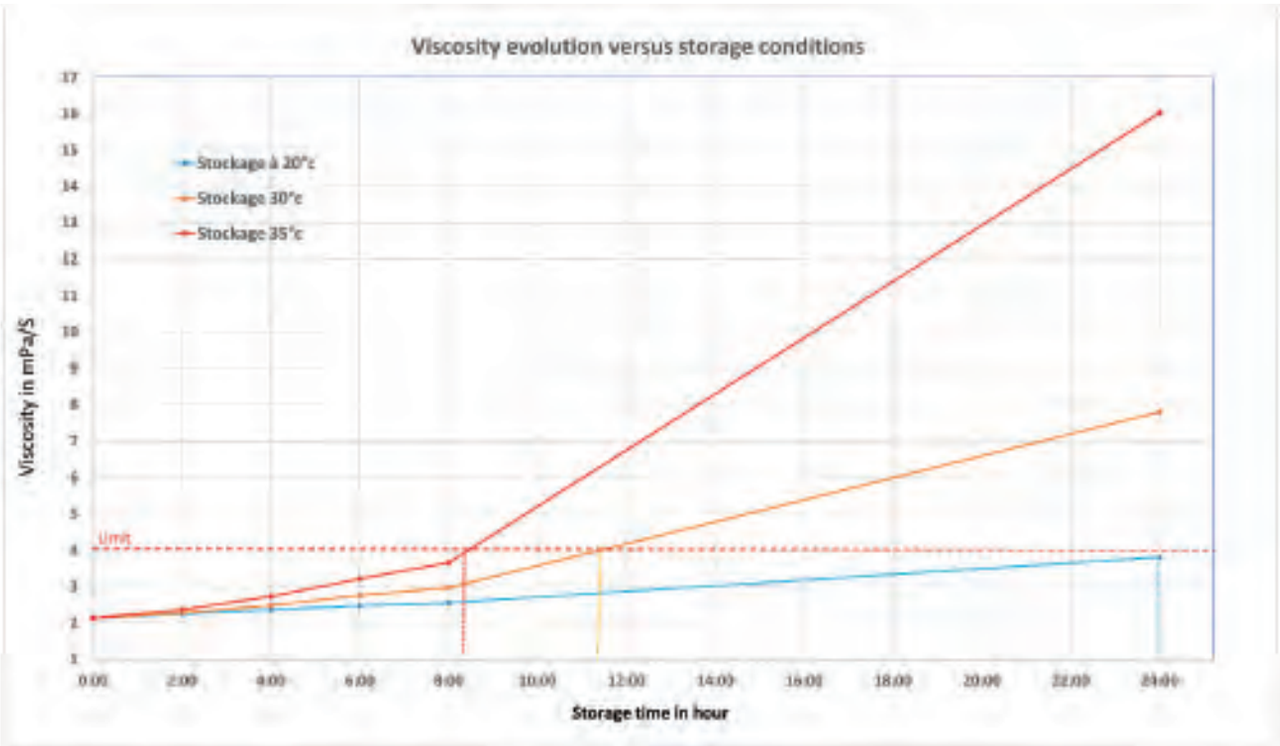


Shoe shine test (Endurance test) on PET and NYLON



Recommendations and Precautions

Resin: The Resi4 BELT's shelf life is highly dependent on the storage temperature.



Disposal and evacuation: Disposal with basic water-based solutions.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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Beyond resin, innovation for life.



FOR HIGH VALUE EPOXY APPLICATIONS

Resi4 EPOXY

A unique, bisphenols-free, renewable-carbon-based epoxy resin engineered for high value applications.

Composites **Structural adhesives** **UV / dual cure coatings**

MICHELIN

Resi4 EPOXY

Our epoxy resin provide **a sustainable alternative** to conventional petro-based epoxy resins, synthesized with a unique, bio-based monomer that replace **bisphenols**.

Resi4 EPOXY is a unique, bio-based epoxy resin for high value project, with high thermal and mechanical properties, ready to be formulated with conventional hardeners.

This epoxy resin is a new alternative to historical epoxy resins, developed according to REACH legislation, for worker safety and end-users.

Benefits and characteristics

High-thermal performance

Glass transition (Tg) **higher than DGEBA** during comparative tests (iso-hardeners: amine, anhydride, ...)

Solving toxicity[1] issues in bisphenols-based resins for end-users and offering regulatory peace of mind

REACH compliant

Monomers **free of bisphenols** by design

Free of CMR and **endocrine disruptors**

Supports your company's sustainable development strategy

Approaching 100% bio-based formulation[2]

Low CO_2 emissions[2]

Advantages

No serious health hazard pictogram VS **Bisphenol-A, Bisphenol-F** and **Bisphenol-S.**



Serious health hazard

Resi4 EPOXY
CO_2 emissions[2] (CO_2kg / kg)



(1)Formulated without chemicals meeting SVHC criteria (Substance of Very High Concern) as defined by European Chemicals Agency in date of 01/01/2026.

(2)Upon availability of our sugar-based monomers industrial demonstrators in 2027. Two of our first main industrial monomers demonstrators are based in France. The bio-based content is based on ISO 16620 guidelines based on internal data. CO2 emission's preliminary figures are based on internal data, compliant with iso 14044 guidelines. The variability of high and low values is depending of sugar sourcing and industrials scale up.



Technical Data Sheet
Resi4 EPOXY

Applications:

Composites | Structural adhesives | UV / dual cure coatings

Product: Resi4 EPOXY.

Description: Epoxy monomeric et oligomeric.

Presentation form: Yellow to orange viscous liquid.

Benefits: Bisphenols-free, high thermal and mechanical properties.

Main application: High performance valuable applications (iso reference).

Main processing method: 1K or 2K dispensing, potting, hot melt.

Main cross-linking: Use standard epoxy hardeners (amines, anhydrides, ...).

Duration of use and storage: Months at room temperature, measurement on going.

Handling precautions: This product must be used in accordance with the instructions in the Safety Data Sheet.

Liquid resin characteristics

Property	Method	Unit	Measure
Viscosity at 25°C	Rheometer	Pa.s	10 – 40
Epoxy content	NMR	meq/g	8 - 9
Water residual	Karl Fisher	%wt	< 0,1
Density	Pycnometer	-	1,3

Thermal performances of the resin

Property	Method	Unit	Measure
Tg (mixed with anhydride)	DMA	°C	> 142 °C *(vs 127°C with DGEBA)*
T5%	ATG	°C	> 250 °C

Destruction and disposal: Cleaning of liquid resin with acetone or ethanol. Disposal with resin waste.

Additional information: For further information, please reach out to us through the contact form on our website (https://resicare.michelin.com/contact/).

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The information presented in this document, intended for explanatory purposes only, is based on our technical and scientific knowledge and on the literature available at the date of publication. None of the information contained herein should be construed as a warranty or representation by the manufacturer, nor as an infringement of existing patents. The manufacturer accepts no responsibility for the information provided.

MICHELIN

RESICARE







Pioneering a better future thanks to bio-based 5-HMF

MICHELIN

OUR JOURNEY

Beyond resin, innovation for life

Founded in 2016, **MICHELIN ResiCare** is rooted in over **15 years** of adhesive formulation expertise gained within the **Michelin Group's research department**. We develop and market **innovative resins** tailored for **specialty applications**, making a **safer** and **preserved** environment possible for **future generations**.

These resins are **high performing**, **bio-based**, and free of any **SVHC*** type substances. Our resin chemistry relies on two main platform chemicals, one of them being **5-hydroxymethylfurfural** (HMF). In order to obtain a large-scale, local and affordable access to HMF, MICHELIN ResiCare decided a few years ago to develop its own HMF production process in cooperation with IFPEN institute.

In 2025, the company launched the construction of the **largest HMF production** plant in Europe.

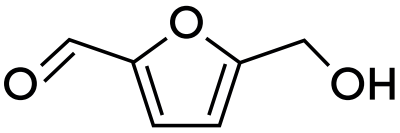


*Substance of Very High Concern as defined by European Chemicals Agency

WHAT WE OFFER

5-HMF is a **100% bio-based** and safe platform chemical used in a wide range of applications. It has long been considered a promising biobased building block due to its versatility and potential to replace petroleum-derived chemicals.





Product specifications

Product: 5-Hydroxymethylfurfural (HMF)

Synonym: 5-Hydroxymethyl-2-furaldehyde

CAS N°: 67-47-0

Molecular formula: $C_6H_6O_3$

Molecular weight: 126.111 g/mol

Purity: 95%

Titration (acqueous solution): 65%

pH: 3-4

Biobased chemical

Feedstock is fructose derived from potato or wheat starch.

Sustainable production

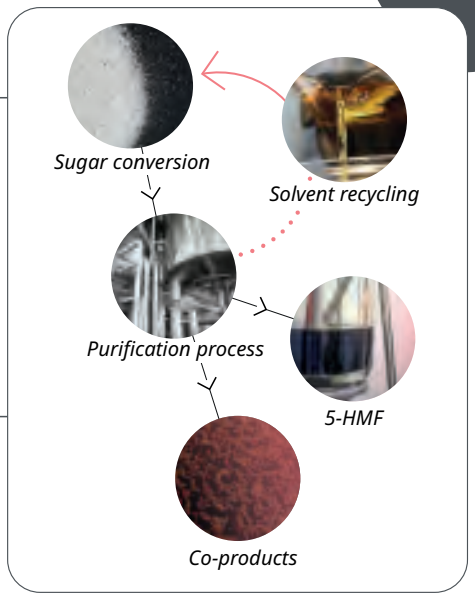
Low carbon

>70% renewable energy

>99% solvent recycling

Water recycling

Byproduct valorization



European origin

First plant located in Roussillon (38), France

Fructose sourced in Western EU



LET'S WAKE UP THE SLEEPING GIANT TOGETHER

The versatility of HMF is allowed by its molecular structure: the molecule contains a **furan ring** as well as **aldehyde** and **alcohol functions**, which make it a platform molecule towards an infinite number of chemical derivatives and polymers.



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Circular Bio-based Europe Joint Undertaking

Bio-based Industries Consortium

Co-funded by the European Union

RÉPUBLIQUE FRANÇAISE

ADEME

FRANCE 2030

Did you know?
REACH regulation focus

I've heard about the REACH regulation...
Should I really worry about it? Does it impact my business?

Yes! Regarding the European directive 2004/37/EC, employers must reduce the use of CMR substances in the workplace. This must be done by replacing the hazardous substance with a safer alternative, if technically feasible!

Got it... Time to improve our chemistry for a safer future!

Sent by Pioneer customer

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CERTIFICATION UTAC ISO 9001
UTAC CERAM