

Biobased Epoxy Resins available at SPECIFIC POLYMERS



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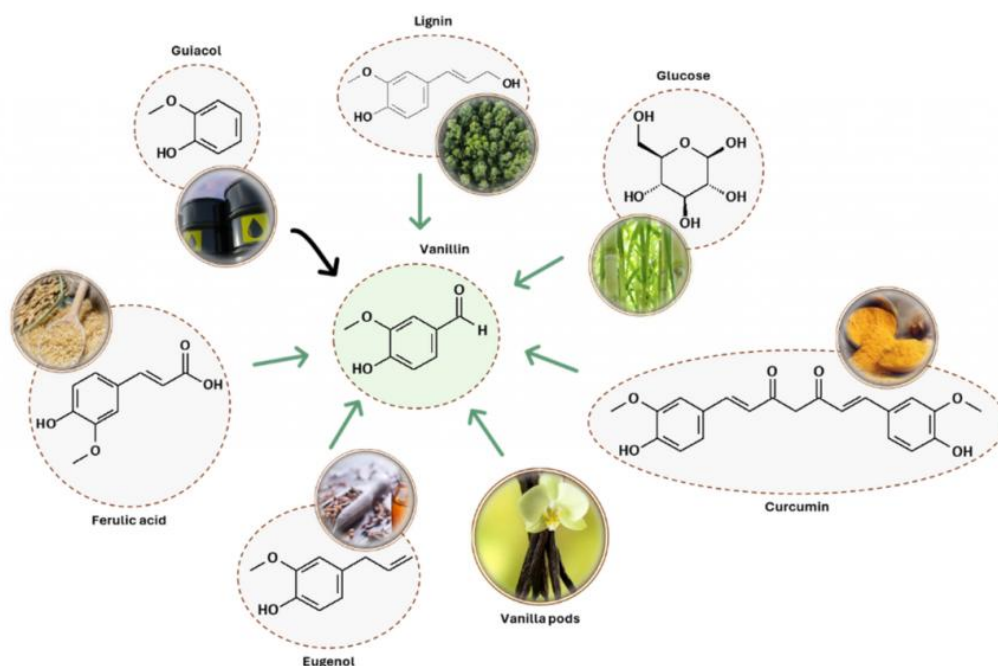
Sustainable Supply Chain for SPECIFIC POLYMERS' Resins

As part of its commitment to **sustainable development**, SPECIFIC POLYMERS is dedicated to **building an eco-responsible supply chain**, focusing on the development of **bio-based epoxy resins**. Over the years, SPECIFIC POLYMERS has been a **pioneer** in offering **high-quality epoxy resins** derived from **renewable resources**, including those made from **various vegetable oils** ([SP-3S-30-005](#); [SP-3S-30-006](#)) and **cardanol** ([SP-3S-30-007](#)). While these **eco-friendly alternatives** suit many applications, their **thermomechanical performance** often **falls short** compared to **traditional DGEBA-based resins**.

That's why SPECIFIC POLYMERS has invested heavily in developing **advanced bio-based resins** using **aromatic or cycloaliphatic synthons** to deliver the **level of performance** expected by industry professionals.

Biobased DGEVA is now available

Biobased vanillin, with an **annual production of 26,000 tons**, is primarily sourced through **two key processes**: the **guaiacol-to-vanillin route** (accounting for 80-85% of production) and the **lignin-to-vanillin route** (covering 15-20%). Additionally, other innovative processes enable vanillin production from **alternative bio-based precursors**, including **guaiacol, ferulic acid, eugenol, curcumin, and glucose**.



It is important to mention that **recent studies** on **vanillic alcohol** and **DGEVA** have confirmed their **lack of endocrine-disrupting effects**, highlighting their potential as **safe and effective alternatives to DGEBA and BPA**.^[1]

[1] Caillol, S. et al. Understanding glycidylation reaction for the formation of pure mono, diglycidyl and dual monomers as glycidyl methacrylate of vanillyl alcohol. *J Appl Polym Sci* 140, e53596 (2023).

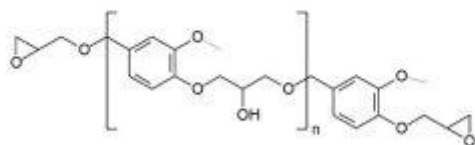
SPECIFIC POLYMERS has been actively exploring these pathways to **identify the most promising resources** for producing **bio-based DGEVA**. In 2023–2024, SPECIFIC POLYMERS successfully achieved the first production batches of bio-based DGEVA. This innovative product is now available in two versions: **DGEVA BIO** (100% bio-based) and **DGEVA BIO 4** (40% bio-based). DGEVA BIO is available up to 1kg and DGEVA BIO4 up to 5kg.

It's worth highlighting that the biobased grades offer **properties equivalent to their petro-based counterpart** ([SP-9S-5-005](#)). They are solids that melt at approximately **50°C to 60°C** and exhibit relatively **low viscosity at 60°C to 80°C** (10–50 cP·s). The typical epoxy index ranges from **6.8 to 7.5 meq/g**, corresponding to an **EEW of approximately 135–150**. Moreover, when formulated with appropriate hardeners, they can reach **glass transition temperatures** ranging from **50°C to 150°C**.

Bio-based DGEVA

SP-9S-5-005_B

SP-9S-5-005_B4



DGEVA BIO4 – Biobased content: 40%

[SP-9S-5-005_B4](#)

DGEVA BIO – Biobased content: 100%

[SP-9S-5-005_B](#)

More information

[Contact us](#)

Biobased PHTE – Phloroglucinol triglycidyl ether

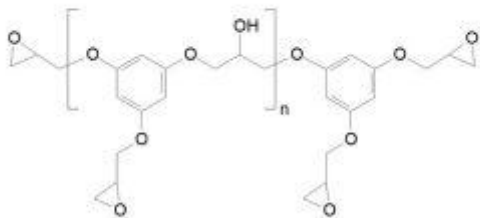
The triglycidyl ether of phloroglucinol (PHTE) is a **BPA-free epoxy resin** designed for high-performance thermoset materials. With its **three epoxy groups**, it enables high crosslinking density, making it ideal for demanding applications.

PHTE is a **yellow to slightly orange, viscous liquid** with a viscosity ranging from **25,000 to 100 cP·s** between **30°C and 80°C**. Its epoxy index typically falls between **7.2 and 8.5 meq/g**, corresponding to an **epoxy equivalent weight (EEW) of 120–140**. When cured with suitable hardeners, it can achieve **glass transition temperatures from 100°C to over 200°C**.

PHTE is now also available in a **60% bio-based version** and can be supplied in **quantities up to 5 kg**. Bulk orders are available upon request.

Bio-based PHTE

SP-9S-5-003_B6



PHTE BIO6

[SP-9S-5-003_B6](#)

More information

[Contact us](#)

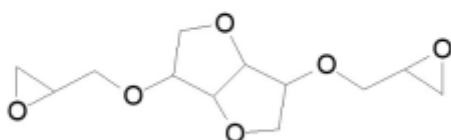
Biobased DGEI – Diglycidyl Ether of Isosorbide

Isosorbide is derived from glucose, a well-known **decomposition product of starch**. In the initial step, glucose undergoes hydrogenation to form **sorbitol**. This sorbitol is then dehydrated, with two sorbitol molecules condensing to create isosorbide. The process typically involves **acid-catalyzed cyclization** and **water removal**, resulting in **isosorbide's distinctive bicyclic diol structure**. At SPECIFIC POLYMERS, we **convert isosorbide into a high-quality epoxy resin**, featuring a **biocarbon content of 50-55%**. This innovative product is available for purchase in quantities ranging from **5g to 25g**.

This product is a **water-soluble**, colorless liquid at room temperature. Its **viscosity** ranges from **170 cP.s to 10 cP.s** as the **temperature shifts from 25°C to 80°C**, making it an **excellent reactive diluent for epoxy formulations** thanks to its optimal flow properties across this temperature spectrum. The typical **epoxy index** is ranged in **between 7.0 and 7.7 meq/g** (EEW of approximately 130-145). DGEI is of interest as a **viable biobased reactive diluent** for epoxy resin formulation.

Bio-based DGEI

SP-9S-5-004_B5



DGEI BIO5

[SP-9S-5-004_B5](#)

More information

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Biobased RTGE – Resveratrol triglycidyl ether

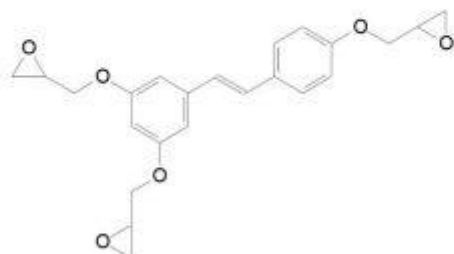
Resveratrol is a **renewable phenolic compound** that can be transformed into **high-performance epoxy resins** offering outstanding properties such as **high glass transition temperatures (Tg)** and **intrinsic flame-retardancy** [1,2]. It can be sourced from **food waste**, notably from the skin of grapes, blueberries, raspberries, mulberries, and peanuts.

Thanks to its multifunctionality and unique chemical structure, **Resveratrol Triglycidyl Ether (RTGE)** represents a promising and sustainable alternative to traditional DGEBA-based epoxy systems.

SPECIFIC POLYMERS now offers **both a petrobased and a 60% bio-based version** of RTGE, available at the **10 to 50 g scale** for proof-of-concept validation.

Bio-based RTGE

SP-9S-5-009_B6



RTGE BIO6

[SP-9S-5-009_B6](#)

More information

[Contact us](#)

Bisphenol-free epoxy resins

SPECIFIC POLYMERS is deeply committed to researching and developing epoxy resins free from bisphenol and has been involved in these efforts for many years. SPECIFIC POLYMERS also propose Bisphenol-free epoxy resin from lab to pilot scale. Read our last article: “Bisphenol-free epoxy resins to substitute DGEBA”

[Read the article](#)