MET-OL™

Next-generation thermoplastic polymer.
Superior performance.
100% recyclable.

The Problem

A linear problem in a circular economy

Advanced composite materials are essential in aerospace, marine, wind energy, and sports. But they come with a major challenge: they can't be efficiently recycled.

- **The EU bans wind turbine blade landfill in 2025 – a shift that demands immediate solutions.**

METOL™

Removes the need to landfill structure's at the end of their life.

METOL can be 100% recycled – retaining its full mechanical properties and value, again and again.

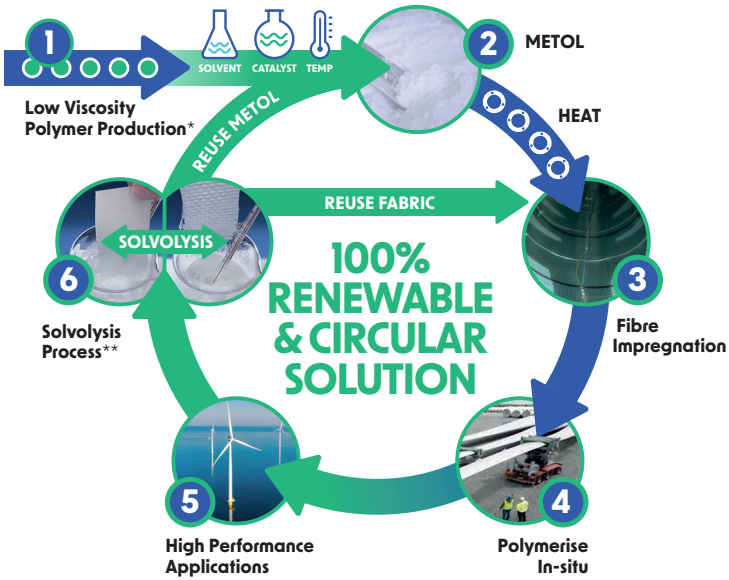
*METOL – Patent applied for method of polymer production process.
**Patent applied for solvolysis process – Chemical separation to recover and reuse base polymer and fibre reinforcements in new applications.

The Solution

METOL – infinite applications, endless possibilities

METOL is a high-performance, fully recyclable thermoplastic polymer, based on Polybutylene terephthalate (PBT), that allows composite structures to be:

- **Manufactured with enhanced mechanical and physical properties –** strong, durable, lightweight
- **Easily manufactured –** with lower costs and faster processing. This proprietary and unique polymer flows like water, saturating fibres more efficiently
- **Adapted for multiple industries –** from wind energy to sports & leisure, from pultrusions to sheet panels.
- **Reclaimed and reused –** without degradation in performance. At the end of its life, it can be dissolved, recovered, and reused – a truly circular solution.

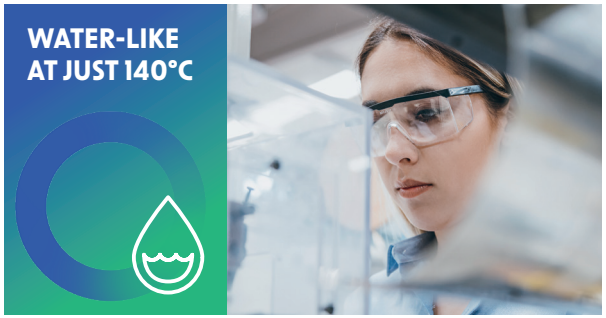


STEP 1: LOW VISCOSITY POLYMER POWDER

Proprietary and unique thermoplastic polymeric oligomer based on PBT

- Dry Inert powder
- Low Molecular weight form of PBT
- Low melting point (140°C)
- Low Melt Viscosity (30cP)
- Polymerises back into high molecular weight PBT through addition of a catalyst and temperature
- No Exotherm

Metol CBT Powder or compounded with fillers/ additives and supplied as a masterbatch



STEP 2: IMPREGNATING THE FIBRES

Parts can be processed using conventional composites manufacturing techniques, including:

PRE-PREG PROCESSES

- Vacuum bag moulding
- Press moulding
- Tape wrapping/laying

RESIN INJECTION PROCESSES

- Vacuum infusion
- Pultrusion
- Filament winding
- Casting

WATER LIKE VISCOSITY 30 CP

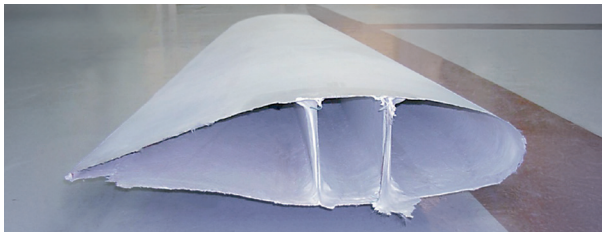
STEP 3: IN-SITU POLYMERIZATION

HIGH MOLECULAR WEIGHT PBT

After impregnation, the METOL polymer is polymerised insitu through the addition of a catalyst and heat into high molecular weight PBT with the resulting fibre reinforced PBT composite parts with enhanced mechanical and physical properties - notably in terms of enhanced impact performance.

OTHER BENEFITS INCLUDE:

- No exothermic reaction – making it suitable for large surface area thick section structures
- No VOC emissions during processing
- High Volume fraction structures with increased strength and stiffness

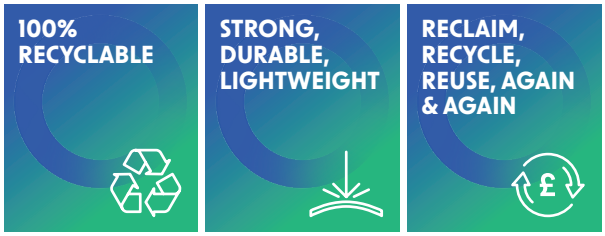


STEP 4: ENHANCED MECHANICAL PERFORMANCE

STRONG, DURABLE, LIGHTWEIGHT

Indicative Tri axial E glass non normalised data, 2 plies (45/-45/0)s, (press mould cured METOL 160 pre dried 24 hours 100°C) epoxy and polyester laminate vacuum infusion cured. Tensile data normalised to 55%Vf.

	METOL 160	Epoxy	Polyester	Test method
ILSS/MPa	46.8 +/- 4.1 (56%Vf)	31.5 +/- 1.4 (53%Vf)	33.3 +/- 1.5 (56%Vf)	EN 14130:1998
Flexural Strength/MPa	597 +/- 25 (53%Vf)	594 +/- 50 (53%Vf)	647 +/- 29 (56%Vf)	ASTM D 790-03
Flexural Modulus/GPa	14.6 +/ -0.6 (53%Vf)	13.9 +/- 1.9 (53%Vf)	15.6 +/- 1 (56%Vf)	ASTM D 790-03
Tensile Strength/MPa	613 +/- 10.7 (55%Vf)	Not tested	436 +/- 94 (55%Vf)	ASTM D 3039
Tensile Modulus/GPa	23.4 +/- 0.2 (55%Vf)	Not tested	30.5 +/- 1.6 (55%Vf)	ASTM D 3039
Strain to Failure/%	1.5 +/- 0.1%	Not tested	0.3 +/- 0.2%	ASTM D 3039
Moisture Uptake/%	+0.2% weight change	+1.6% weight change	+0.4 % weight change	ASTM D 5229

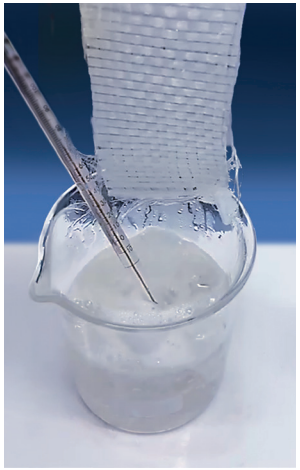


STEP 5: UNIQUE & EFFICIENT RECYCLING TECHNIQUES

METOL vs Thermosetting resins

UNIQUE SOLVOLYSIS TECHNOLOGY

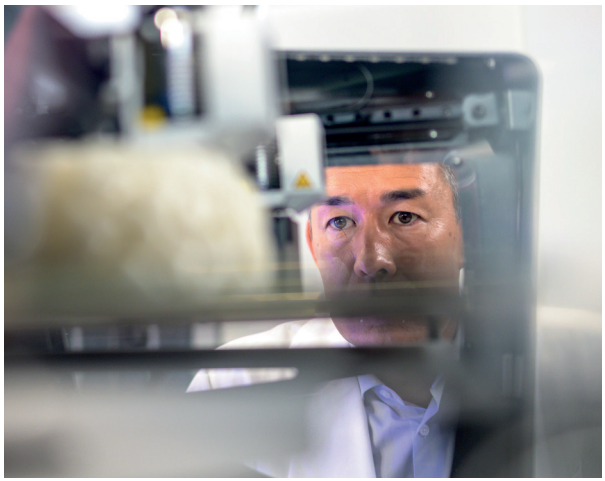
Separates, recovers and enables both fibre reinforcements and PBT polymer to be re-used.



CLEAR BENEFITS OVER ALTERNATIVES

The competitive advantages of METOL against Thermosetting resins are as follows:

- No handling and storage of hazardous chemicals (reduced fire risk)
- No VOC emissions during processing or dermatological issues (epoxies)
- No exotherm during processing (reduced fire risk, especially for thick sections)
- Faster cycle times (lower part cost)
- Higher mechanical properties notably impact, abrasion resistance and ILSS
- High fibre volume fractions (higher strength and stiffness)
- 100% recyclable and re-usable



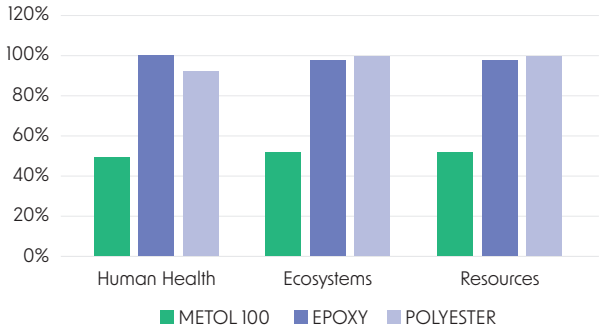
Independent Tests

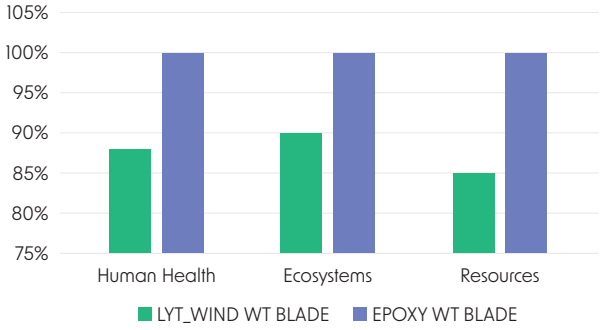
Life Cycle Analysis – Wind Turbine Blade

When it comes to material inventory, METOL outperforms typical Epoxy and Polyester base materials in 20 out of 22 impact parameters.

METOL reduces environmental impact of base material by approx. 50% on all three major categories of human health, ecosystems, and resources.

Loughborough University





Let's Talk

Collaboration Opportunity

WE ARE LOOKING FOR:

- **Investors** – Those interested in capitalising on a unique sustainable technology that will revolutionise the composites industry.
- **Industrial Partners** – Companies willing to collaborate on design, development, testing, certification, and commercialisation of METOL technology, with benefits such as first-adopter advantages or exclusive licensing arrangements.
- **Industrial companies** – Firms interested in to licensing METOL's manufacturing technology in territory.

PLEASE SCAN TO DOWNLOAD THE TECHNICAL DATA SHEETS:

Or for more information contact:

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Telephone: **+44 774 8635315**

Infinite applications.
Endless possibilities.

Want to collaborate? Let's talk.

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Please scan to find out more about investor oppotunities:

metol.co.uk