

ASX ANNOUNCEMENT

FOR IMMEDIATE RELEASE TO THE MARKET

PPK Group Limited – ASX Code: PPK

22 August 2022

Positive test results received for white graphene in gelcoat

PPK Group Limited (ASX Code: PPK) is pleased to announce that following on from the positive test results announced in March 2022, its subsidiary White Graphene Limited (WGL) has received further highly encouraging results from its 'polymer and resin coatings' research and development project following testing of white graphene as an additive to commercially available gelcoat.

White graphene is currently manufactured by White Graphene Limited at its plant in Geelong, Victoria.

The team has worked with the Institute of Frontier Materials (part of Deakin University) to research the effects of adding white graphene to two commercially available gelcoats. Gelcoat is an outer layer of a laminate commonly used to protect boats and wind turbine blades from the effects of corrosion and moisture.

The addition of less than 1% by weight of white graphene was found to significantly improve many of the gelcoat properties including water, wear, and corrosion resistance, hardness and tensile strength.

Furthermore, underwater friction was reduced by up to 50%. This is a critical finding that could lead to innovative new gelcoats for boat hulls that not only increase corrosion resistance but also improve the fuel efficiency by reduce drag in the water.

These polymer enhancement and matrix reinforcement technologies further demonstrate the opportunity for significant and viable large scale industrial use of boron nitride nanomaterials in the manufacture of everyday products. WGL continues to undertake further research to investigate the extent to which white graphene coatings can be made impermeable to hydrogen, to improve the durability of hydrogen storage and transport systems.

The PPK Board commented:

"These strong research and development results represent a potentially material outcome for the PPK Group. It demonstrates that WGL can produce white graphene affordably and at scale with the underlying material having many applications in multi-billion dollar global markets. The significant improvement we have seen in the properties of gelcoat once again demonstrate the value that even small amounts of white graphene can bring to the high value coatings market, and we look forward to working with market leaders to develop new products."

A summary of the research and development results is set out in the attachment to this announcement.

This announcement has been made and authorised by the PPK Group Board.

For further information contact:

Robin Levison

Chairman - PPK Group Limited
On 07 3054 4500

Marc Fenton
Chief Operating Officer - PPK Group Limited
On 07 3054 4500

- Gelcoat is the outer aesthetic and functional (corrosion- and moisture-resistant etc.) surface of a laminate, commonly used to protect boat hulls
- It is also used to protect wind turbine blades and any fibreglass or carbon fibre structures
- Deakin's Institute of Frontier Materials (IFM) undertook standardised testings on two commercially available gelcoats with White Graphene concentrations of <1% by weight
- Improved properties include:
 - ✓ **Water resistance:** up to 40% improvement;
 - ✓ **Corrosion resistance:** improved salt water anti-corrosion;
 - ✓ **Wear resistance:** improved by up to 900%;
 - ✓ **Friction coefficient:** underwater friction reduced by up to 50%;
 - ✓ **Hardness:** improved by up to 20%;
 - ✓ **Tensile strength:** improved by up to 40%;



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A/Prof. Dr. Luhua Li
Lead Scientist

Gelcoat results

The global market for gelcoat coating is expected to reach **\$2.54 billion** by 2027.*

The most important properties of a gelcoat are:

- Water resistance
- Wear resistance
- Hardness
- Mechanical strength
- Adhesion or bonding strength
- Moisture impermeability
- Corrosion resistance
- Weather resistance
- Anti-fouling (anti-bacteria)

* Gelcoat Market Study; Research and Markets, PRNewswire, Jan 17, 2020.

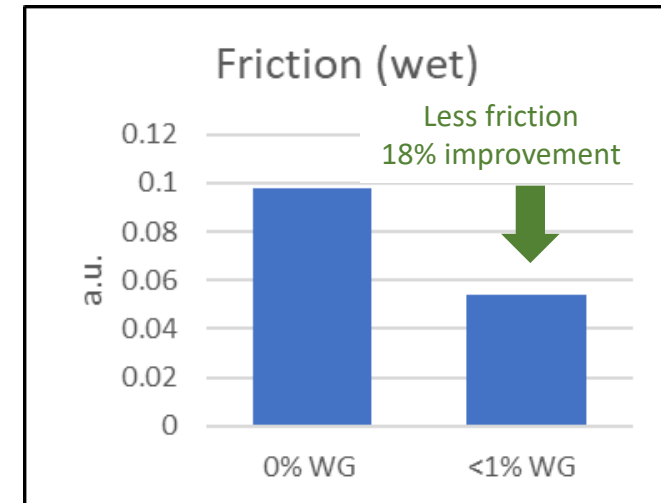
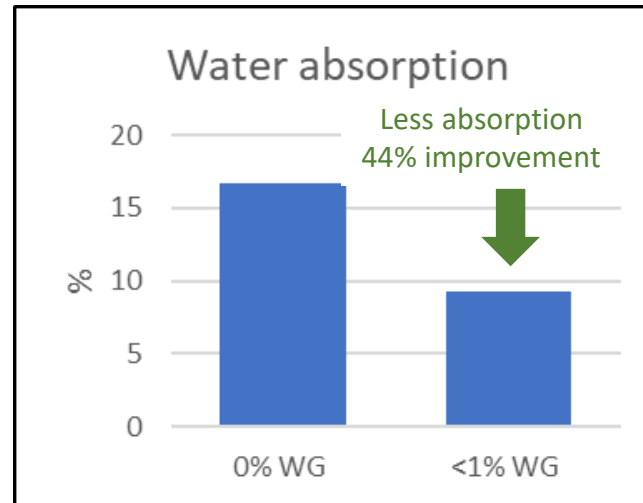
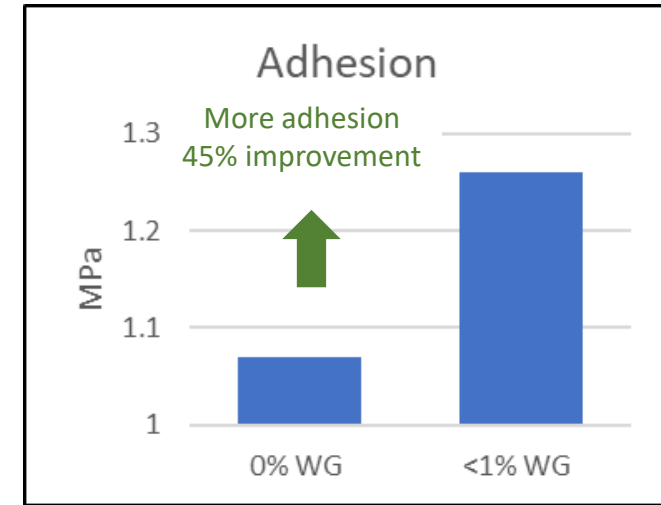
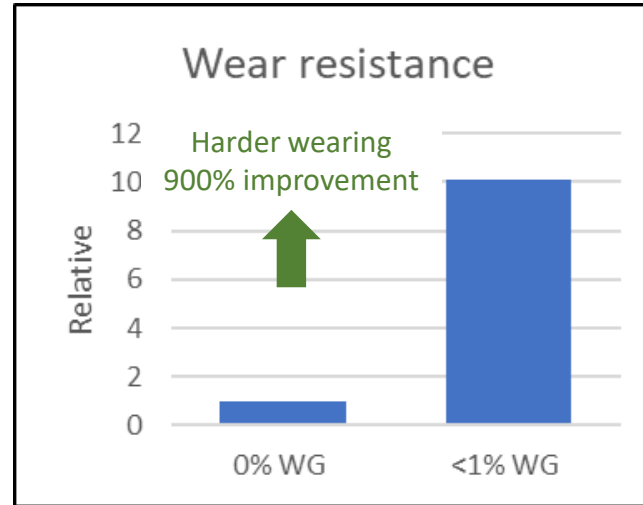
Neutral colour gelcoat



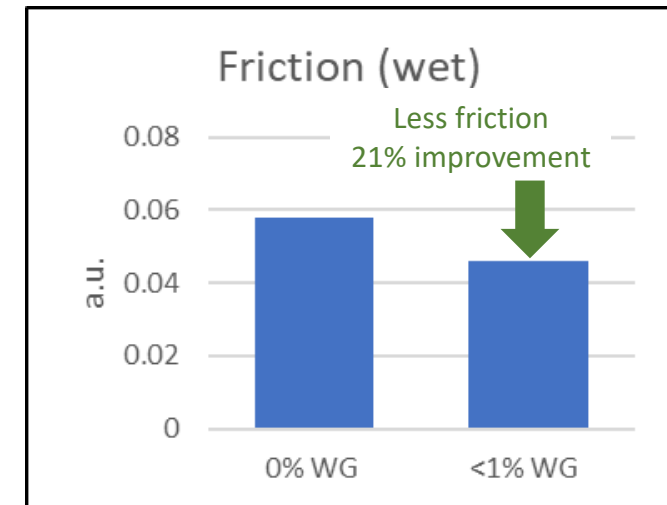
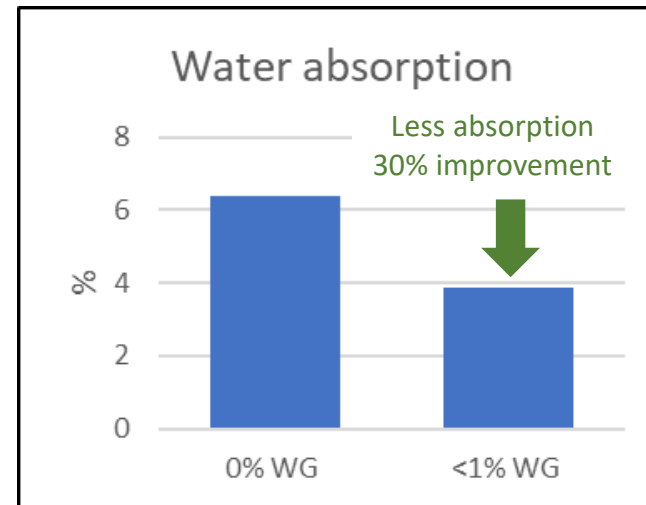
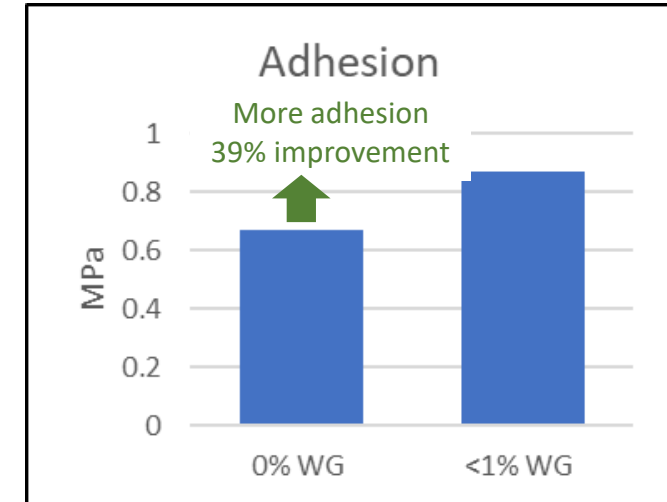
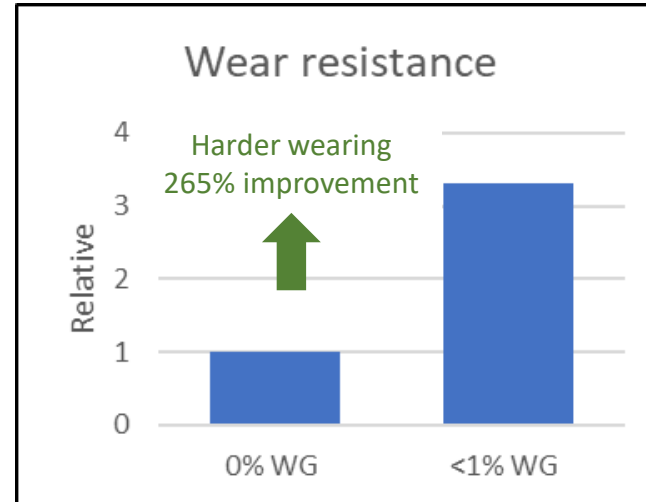
White marine gelcoat



1. Neutral brush gelcoat



2. White marine gelcoat



Other test results

Preliminary results on a range of other tests showed similarly positive results with the addition of less than 1% by weight of White Graphene.

Test	Neutral Brush Gelcoat	White Marine Gelcoat
Moisture impermeability	No H ₂ O penetration detected	No H ₂ O penetration detected
Salt water corrosion resistance	Improved	Improved
Weather resistance	Improved and no yellowing	n/a
Hardness	20% improvement	10% improvement
Tensile Strength	40% improvement	30% improvement
Tensile Strain	10% improvement	40% improvement
Antibacterial performance	Already strongly antibacterial	Most bacterial colonies eliminated
Hydrophobic (contact angle)	50% improvement	40% improvement