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ASX ANNOUNCEMENT

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The world's leading graphene company

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PureGRAPH® significantly improves rubber polymers used in the mining sector

HIGHLIGHTS

- **Laboratory and commercial scale tests demonstrate PureGRAPH® improves rubber compounds in mining screen media and wear-liner materials**
- **Further tests will now look at improved dispersion and fire retardancy aspects**
- **Tests were completed on in excess of 35 compounds using formulation variations**
- **Results provide platform to introduce PureGRAPH® into other compounded rubber materials**

First Graphene Limited ("ASX: FGR" or "the Company"), is pleased to provide an update on the incorporation of PureGRAPH® into rubber compounds for applications in the mining sector.

As reported in March this year, FGR commenced work on the manufacturing of PureGRAPH® powders into long-chain rubber polymers.

To leverage customer interest, FGR concentrated on the compound most commonly used in the mining screen media market, with potential to adapt the findings into other sacrificial wear-liner rubber materials across the industry.

The work has been conducted in conjunction with an experienced rubber consultant in Perth and an established rubber processor in Ipoh, Malaysia.

First Graphene Managing Director, Craig McGuckin says the results from the extensive test work undertaken are encouraging.

"The initial work demonstrates a low dosage of PureGRAPH® provides improvements over the base material most commonly used for the mining screen media market," McGuckin said.

"Further tests will be undertaken with the PureGRAPH® compounded rubber for both mining screen and sacrificial wear media, as this is a large market and one in which we are actively engaged with both suppliers and end users.

"The results so far provide the platform to introduce PureGRAPH® into other compounded rubber materials both in industrial and domestic use."

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Initial Science

FGR engaged an experienced rubber consultant to understand the science associated with the compounds used in the mining screen and wear media markets.

Rubber compounds vary considerably depending on their use. Screening tests were completed on 35 compounds using formulation variations and compounded on a laboratory scale two-roll mill, similar to that in Figure 1.

The two-roll mill allowed for multiple small batches of rubber to be produced with adjusted PureGRAPH® concentration and rubber chemistry. A range of mechanical testing could then be carried out on each batch to evaluate performance and produce the following data displayed in Figure 2.



Figure 1, Lab scale two roll mill

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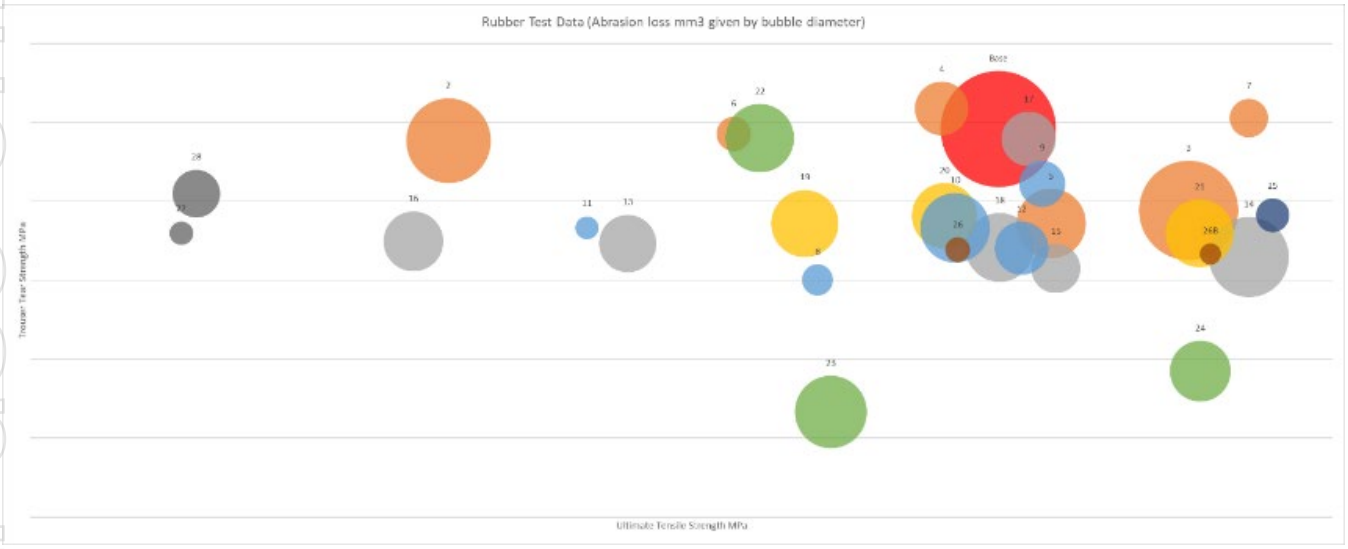


Figure 2: Bubble chart demonstrating mechanical performance of various graphene enhanced rubber formulations. Y axis represents tear strength, X axis represents tensile strength and the bubble diameter shows abrasion loss.

Figure 2 demonstrates that multiple mechanical improvements can be achieved through low addition rates of graphene using a two-roll mill. This resulted in a better understanding of how certain mechanical properties can be tailored for specific applications through adjustments to the graphene concentration and rubber chemistry.

Upscaling of Test Work using PureGRAPH®

Laboratory testing demonstrated the benefits for numerous graphene enhanced rubber compounds using a two-roll mill.

Laboratory scale equipment does not fully resemble the processing conditions present in full scale commercial rubber compounding, typically carried out in large internal mixers followed by industrial two-roll mills, and so it was important to upscale the laboratory testing to better simulate commercial rubber compounding and demonstrate the benefits of graphene under this environment.

For the commercial scale tests, a control rubber was selected based on industry compounding experience, demonstrating the desired mechanical properties of a typical hard rock screen or wear liner application.

A production scale run of this material was then compounded using the Malaysian partner's commercial production process line, both with and without the addition of PureGRAPH®. The compounded rubber was then moulded into large prototype parts and test sheets for mechanical testing.

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Figure 3, Senior Process Engineer, Neil Armstrong, with products made in Malaysia

Results from PureGRAPH® enhanced rubber

The following table outlines the improvements achieved from the incorporation of PureGRAPH®20 in the base material used for mining screen or wear media compounds.

Ultimate Tensile Strength, AS1683	Die C tear resistance, ASTM D624	Trouser tear, ASTM D624	Abrasion Loss (FGR test), Internal Method	Abrasion Loss – taber, ASTM D4060
+20.3% ↑	+25.8% ↑	+12.1% ↑	-5.3% ↓	-66.0% ↓

Table 1 – PureGRAPH enhanced rubber compared to base compound.

The improvement in abrasion resistance (i.e. decrease in abrasion wear over the base material) and tear strength is of particular importance for improved performance and longevity of screen media.

As detailed in Table 1, both abrasion resistance and tear strength can be significantly improved through a low addition rate of PureGRAPH® into the rubber compound.

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Client compounded PureGRAPH® enhanced rubber screens are currently in field trials in the mining industry in Western Australia.

Further laboratory test work is underway on additional rubber compounds and processing techniques focussing on improved compound dispersion and fire-retardant applications. Updates will be provided as this work is completed.

-ENDS-

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About First Graphene Ltd (ASX: FGR)

First Graphene Ltd. is the leading supplier of high-performing, graphene products. The company has a robust manufacturing platform based upon captive supply of high-purity raw materials and an established 100 tonne/year graphene production capacity. Commercial applications are now being progressed in composites, elastomers, fire retardancy, construction and energy storage.

First Graphene Ltd. is publicly listed in Australia (ASX:FGR) and has a primary manufacturing base in Henderson, near Perth, WA. The company is incorporated in the UK as First Graphene (UK) Ltd. and is a Tier 1 partner at the Graphene Engineering and Innovation Centre (GEIC), Manchester, UK.

PureGRAPH® Range of Products

PureGRAPH® *graphene powders are available in tonnage volumes with lateral platelet sizes of 20µm, 10µm and 5µm. The products are high performing additives, characterised by their high quality and ease of use.*