

FGR secures agreement with UK's largest cement manufacturer

Highlights

- **FGR enters Development and Commercialisation agreement with leading UK cement manufacturer Breedon Group**
- **Collective objective to enhance Breedon Cement's CEM II mechanical properties to improve compressive strength and reduce the company's carbon footprint**
- **Graphene enhanced grinding aids and cement admixtures to be formulated and supplied by FGR, as well as developing methods for adding them into cement production facilities**
- **Breedon to provide increased access to industrial scale production lines to optimise understanding of processing environment and operating conditions**

First Graphene Limited (ASX: FGR; "First Graphene" or "the Company") is pleased to announce it has entered a Joint Development and Commercialisation Agreement ("Agreement") with the UK's largest cement manufacturer, Breedon Group ("Breedon") at their Hope Cement Works in the Peak District National Park.

The agreement will facilitate First Graphene's development of a range of graphene-enhanced solutions to reduce the clinker factor of Breedon's cement and as a result reduce its carbon emissions footprint.

Both companies have agreed to focus on enhancing the mechanical performance of Breedon's CEM II Cement, which has a lower clinker factor than CEM I, such that its compressive strength matches that of its CEM I product.

Breedon will provide FGR with access to its Hope Cement Works manufacturing facility in Derbyshire and the expertise of staff to assist development and implementation of graphene dosing techniques and improved low-emission cement-based products.

Background

The Agreement comes ahead of FGR and Breedon launching a second phase of trials aimed at optimising dosage rates and method of PureGRAPH[®] enhanced products at Hope Cement Works.

Phase one of the trials, completed in September 2023, used approximately 600kg of PureGRAPH[®] to produce several hundred tonnes of CEM II cement.

Lower amounts of carbon intensive clinker are used in the production of CEM II, delivering a 15% reduction in carbon emissions compared to the primary CEM II cement, providing the cement and concrete industry with a solution to meet environmental sustainability targets.

The initial trials demonstrated the potential of increasing the early-stage compressive strength by up to 10%, which is a considerable mechanical property improvement when compared to equivalent controls.

Once manufactured, the graphene enhanced cement and concrete was used to create a temporary wheel washing facility at a live infrastructure project that is being delivered by trial partner Morgan Sindall Group.

Details of the Agreement

Under the initial two-year Agreement, FGR will conduct wide ranging research, provide specialist advice and technical support on graphene and graphene-based formulations.

Preparation of graphene formulations for use in cement grinding aids and cement admixtures will be supported by the development and design methods for adding graphene into production facilities and to manufacture industrial scale quantities of graphene enhanced cement.

Breedon will supply FGR with access to cement market data, as well as support and access to its Hope Cement Works processing facility and personnel support, enabling it to conduct trials in a controlled environment.

Both parties, along with other industry partners, will be involved in testing and validating the performance of graphene enhanced cement and concrete produced under the Agreement.

Should results of research and development work undertaken through the Agreement deliver commercial opportunities, First Graphene retains the right to own the intellectual property for any product being delivered to the open market.

Agreement opens door to potential market opportunities

The decision to partner with the UK's largest cement producer, who has a genuine need for cutting-edge materials technology to improve its carbon footprint, coupled with the validated commercial scale trial results announced previously, marks a significant next step for First Graphene's strategy of commercialising graphene at an industrial scale.

To put it in context, Breedon produces over two million tonnes of cement annually, its annual production of ready-mixed concrete is close to three million cubic meters. It is also ramping up investment in the ability to integrate CEM II into its concrete mixes, to help meet carbon reduction and sustainability targets of both its own business, and that of its customers.

This strategy is part of Breedon's commitment to reduce carbon emissions 30% by 2030 and reach net zero by 2050, in line with the Global Cement and Concrete Association's (GCCA), targets for the industry more broadly.

As a key partner, Breedon will receive a preferential price on any future commercial product developed under the Agreement.

Considering Breedon's own extensive output and the increasing global demand for concrete (four billion tonnes per annum¹ and expected CAGR of 5% 2022-2029²), there is a very clear growth potential for market penetration of First Graphene's PureGRAPH® range of products.

First Graphene Managing Director and CEO Michael Bell said:

"First Graphene is very excited about formalising our partnership with Breedon and ramping up our commercialisation journey in the cement and concrete sector.

Breedon is an early adopter and exemplar of carbon reduction initiatives in the cement and concrete sector, with a firm goal of reducing its own gross carbon output by 30% by 2030 and helping meet their clients' own sustainability objectives.

Through our Agreement, First Graphene intends to help Breedon reach its target as well as improve market penetration for graphene enhanced cement and concrete products, which can drastically reduce carbon emissions produced by the sector."

Jude Lagan, Managing Director, Breedon Group (Cement) said:

"This new partnership with First Graphene is another significant step in the right direction as we execute our Net-Zero strategy and help play our part in the decarbonisation of the broader cement industry.

In order to achieve our targets by 2050, our industry needs to constantly innovate and adapt. We are looking forward to undergoing further trials to understand how we can optimise the use of graphene in our processes and continue to develop products that have significant environmental benefits."

This announcement has been approved for release by the board

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¹ <https://www.statista.com/statistics/1087115/global-cement-production-volume/>

² <https://www.fortunebusinessinsights.com/industry-reports/cement-market-101825>

About First Graphene Ltd (ASX: FGR)

First Graphene Limited is focused on the development of advanced materials to help industry improve. The Company is a leading supplier of graphitic materials and product formulations with a specific commercial focus on large, high-growth global markets including cement and concrete; composites and plastics; coatings, adhesives, silicones and elastomers (CASE); and energy storage applications.

One of the key outcomes these advanced materials offer is the reduction of carbon dioxide emissions, whether directly through a reduction in output of these harmful greenhouse gases or lower energy usage requirements in manufacturing, or indirectly due to enhanced performance characteristics and extending the usable life of products.

First Graphene has a robust manufacturing platform based on captive and abundant supply of high-purity raw materials, and readily scalable technologies to meet growing market demand. As well as being the world's leading supplier of its own high performance PureGRAPH® graphene product range, the Company works with multiple industry partners around the world as a supplier of graphitic materials and partner to research, develop, test and facilitate the commercial marketing of a wide range of sector-specific chemical solutions.

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, where it has a strong marketing and R&D capability.