Exceptional Thermal Conductivity and Diffusivity Results Confirms VHD as Leading Thermal Management Product

- Results from independent like-for-like testing completed by the University of New South Wales (UNSW) confirms the Company's Very High Density (VHD) technology delivers superior thermal conductivity and thermal diffusivity, clearly outperforming conventional materials such as copper and aluminum.
- Like-for-like thermal conductivity testing showed VHD delivered 1.3x the performance of copper and 3x that of aluminum. VHD achieved a thermal conductivity of 422 W/m·K, compared with copper of 328 W/m·K and aluminum of 142 W/m·K.
- Like-for-like thermal diffusivity testing confirmed VHD's superior thermal diffusivity, performing 2.9x better than copper and 4.6x better than aluminium.
- These results show VHD not only removes heat from the heat-generating source better than conventional materials (thermal conductivity), but also addresses the dynamic heat demands of data centres, high-performance computing and power electronics better than conventional materials.
- Customer qualification program continues, with feedback further validating the exceptional thermal conductivity and diffusivity results of VHD as previously announced[1].

Green Critical Minerals Ltd (**ASX: GCM** or the "**Company**") is pleased to report outstanding thermal conductivity results and an update on outstanding thermal diffusivity performance, following the completion of an independent testing program by UNSW.

As AI computing, data centres, and high-performance electronics push thermal demands to new limits, traditional materials like copper and aluminium are facing fundamental performance limits. VHD technology is not only demonstrating the ability to replace these materials, but also significantly outperform them, with results showing the potential to offer a lighter, more efficient and cost-effective alternative for next-generation cooling solutions.

Green Critical Minerals' Managing Director, Clinton Booth, commented: *"This latest and final round of testing and results mark another significant milestone in the commercialisation of our VHD technology and products, confirming VHD's ability to revolutionise high-performance thermal management.*

"The like-for-like testing performed by the University of New South Wales has validated the superior and exceptional thermal management characteristics of VHD and through this program, we have validated that VHD outperforms copper and aluminium in both thermal conductivity and thermal

[1] See ASX announcement dated 17 February 2025.

diffusivity, both key performance metrics for managing heat loads in the technology and high-performance electronics sectors.

"These results, along with excellent feedback received from customer testing, further support our belief that VHD technology will become a leading thermal management product, as we move through the final stages of commercialisation.

"In just twelve months, we have made impressive progress, achieving and exceeding the milestones we set – validating the superior thermal performance of VHD, moving from pilot plant to an operating production plant, moving through the customer qualification process, including introducing VHD to global customers and customer testing of samples and initial stage agreements. All of this supports our targeted first revenue in the first half of calendar year 2026."

THERMAL CONDUCTIVITY AND THERMAL DIFFUSIVITY - DIRECT COMPARISON TEST RESULTS

GCM previously reported the thermal diffusivity results for its VHD technology[2], comparing these results against typically reported values for conventional thermal management materials, including copper and aluminium[3].

There are many factors which influence testing results, including the test equipment and test rig. To ensure a direct like-for-like comparison of VHD to its thermal management peer materials, GCM commissioned UNSW to perform the identical testing regime on the conventional thermal management materials of copper and aluminium (like-for-like testing), and to also perform additional testing to calculate the thermal conductivity of VHD, copper and aluminium.

Thermal Conductivity

Results from UNSW testing are presented in Table 1: Thermal Conductivity Test Results.

These results confirm and validate, on a direct comparison of VHD to its conventional thermal management material peers, the exceptional thermal conductivity performance of VHD. On a like-for-like testing comparison, VHD (in-plane) has 3x the thermal conductivity of aluminium and 1.3x that of copper.

In addition to these results and as part of the commercialisation of VHD, GCM has received positive feedback from customers performing thermal testing. This includes feedback from a customer that the testing rig they constructed indicates an estimated in-plane thermal conductivity of +600 W/m·k, aligning with the reported results from the inventor of VHD[4].

[2] See ASX announcement dated 17 February 2025.
[3] Determined from research conducted by GCM Management.
[4] See ASX announcement dated 30 October 2024.

Material	Thermal Conductivity (W/m·k) Previously Reported[5,6,7]	Thermal Conductivity (W/m·k) Like-for-Like Test Results[8]
VHD (in-plane)	**617**	**422**
Copper	400	328
Aluminium	205	142

Table 1: Thermal Conductivity Test Results

Thermal Diffusivity

Results from UNSW testing are presented in Table 2: Thermal Diffusivity Test Results.

These results confirm and validate, on a direct comparison of VHD to its conventional thermal management material peers, the exceptional thermal diffusivity performance of VHD compared to aluminium and copper. On a like-for-like testing comparison, VHD (in-plane) has 4.6x the thermal diffusivity of aluminium and 2.9x copper, better than that previously reported.

Material	Thermal Diffusivity (mm^2/s)[9,10,11] Previously Reported[12]	Thermal Diffusivity (mm^2/s)[13] Like-for-Like Test Results
VHD (in-plane)	**285**	**286**
Copper	111	98
Aluminium[14]	97 (64 for 6061 grade)	63

Table 2: Thermal Diffusivity Test Results

[5] See ASX announcement dated 30 October 2024.
[6] As reported to GCM by the inventor of VHD technology, Professor Charles Sorrell.
[7] Determined from research conducted by GCM Management.
[8] All results determined from test work performed and calculated by the University of New South Wales.
[9] VHD determined from test work performed by the University of New South Wales, using the laser flash process.
[10] Determined from research conducted by GCM Management.
[11] Results present performance at room temperature
[12] See ASX announcement dated 17 February for these results.
[13] All results determined from test work performed by the University of New South Wales, using the laser flash process, using pure copper (99.99%) and aluminium 6061 alloy.
[14] The previously reported thermal diffusivity value for aluminium was pure aluminium, typical heat sink aluminium is 6061 alloy.

THERMAL PERFORMANCE: WHAT THIS MEANS

Thermal conductivity measures how readily a material conducts heat, essentially how well heat flows from and through materials.

Thermal diffusivity measures how fast a material's temperature can change in response to a heat input, essentially how quickly heat dissipates through a material.

In practical terms, thermal conductivity drives steady state heat flow, whereas thermal diffusivity drives dynamic heating and cooling performance – those situations where a heat spike occurs. Heat spikes occur as a demand is placed on the power device.

A simplified way of understanding this is to consider the sending of an AI chat command. The sending of a command causes the graphics processing unit (GPU) and central processing unit (CPU) in a data centre to draw power to complete the compute task, resulting in a heat spike to the GPU and CPU, which needs to be managed. Once at the required level of compute power, the power demand remains constant until the chat command task is complete, at which time the power demand and heat load are reduced.

It is this combination of superior and exceptional thermal conductivity and thermal diffusivity that sets VHD apart as a thermal management material.

Not only does VHD remove heat from the heat-generating source better than conventional materials (thermal conductivity), VHD also addresses the dynamic heat demands better than conventional materials.

This final set of VHD block test results validate the superior thermal performance of VHD, confirming it as an advanced market leading mass production thermal management material. These results provide further validation of the significant opportunities for VHD in the forecast annual +US$2 trillion technology and electronics markets[15].

For further information, please contact:

Clinton Booth
Managing Director
enquiry@gcminerals.com.au
(08) 9388 0051

Stephanie Richardson / Annalise Batchelor
Sodali & Co
stephanie.richardson@sodali.com / annalise.batchelor@sodali.com
(08) 6160 4903

[15] See ASX announcement dated 30 October 2024.

Authorisation

The provision of this announcement to the ASX has been authorised by the Board of Directors of Green Critical Minerals Limited.

Forward Looking Statements

This release contains estimates and information concerning our industry and our business, including estimated market size and projected growth rates of the markets for our products. Unless otherwise expressly stated, we obtained this industry, business, market, and other information from reports, research surveys, studies and similar data prepared by third parties, industry, and general publications, government data and similar sources. This announcement also includes certain information and data that is derived from internal research. While we believe that our internal research is reliable, such research has not been verified by any third party. Estimates and information concerning our industry and our business involve a number of assumptions and limitations. Although we are responsible for all of the disclosure contained in this announcement and we believe the third-party market position, market opportunity and market size data included in this announcement are reliable, we have not independently verified the accuracy or completeness of this third-party data. Information that is based on projections, assumptions and estimates of our future performance and the future performance of the industry in which we operate is necessarily subject to a high degree of uncertainty and risk due to a variety of factors, which could cause results to differ materially from those expressed in these publications and reports.

Appendix A – Table of Results[16,17]

VHD

Test #	Thermal Diffusivity (In-plane) mm^2/s	Thermal Conductivity (In-plane) W/m·k
1	286.772	423.325
2	288.045	425.278
3	282.637	417.493
Average	**285.801**	**422.032**

Copper

Test #	Thermal Diffusivity mm^2/s	Thermal Conductivity W/m·k
1	91.257	313.267
2	104.637	342.530
3	100.459	328.533
4	93.310	326.289
5	100.634	329.301
Average	**98.059**	**327.984**

[16] Testing performed and calculated by the University of New South Wales, using laser flash methodology.
[17] Results presented for tests performed at room temperature.

Aluminium

Test #	Thermal Diffusivity mm^2/s	Thermal Conductivity W/m·k
1	63.768	143.392
2	51.345	116.416
3	66.018	149.385
4	65.370	148.078
5	66.474	150.280
Average	**62.595**	**141.51**