

Empire Metals Limited / LON: EEE / Sector: Natural Resources

10 March 2025

Empire Metals Limited
("Empire" or "the Company")

High-Purity TiO₂ Product Achieved

Empire Metals Limited (LON: EEE) the AIM-listed resource exploration and development company, is pleased to announce the results from its recent titanium dioxide ("TiO₂") product development testwork programme, carried out on mineral concentrates produced from the in-situ mineralised weathered cap that extends across the Pitfield Project ('Pitfield'), located in Western Australia.

Highlights

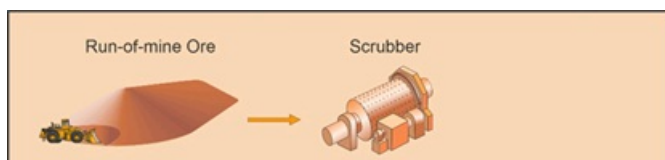
- Preliminary testwork has delivered a high-purity TiO₂ product, which assayed at 91.6% TiO₂.
- The TiO₂ product under development was entirely free of any deleterious impurities and is suitable for high-quality titanium sponge metal or high-grade titanium dioxide pigment production.
- Additional testwork is underway to refine the metallurgical implementation and to further improve the product quality.
- Metallurgical bulk samples currently being collected from the weathered cap (announced 17 February 2025), will be utilised over the coming months to produce a bulk product sample which will enable the Company to advance its product marketing strategy.

Shaun Bunn, Managing Director, said: "I am extremely pleased to announce the breakthrough achievement of recovering a high-purity TiO₂ product that would be suitable for either titanium sponge metal or high-quality TiO₂ pigment production. Development of the processing flowsheet continues at a remarkable pace, a testament to the talent of our project team. Now, with the success of our very first product finishing trial, we have tested every stage of our process flowsheet, confirming its suitability in recovering titanium dioxide from anatase and rutile, the most abundant titanium minerals encountered in the in-situ mineralised weathered cap.

"The focus will now shift back to developing a more comprehensive understanding of the ore characteristics, and the potential to further improve the efficiency of each stage of the process, through further bench scale testing. This ongoing work will cover the entire flowsheet, including ore handling, mineral separation, beneficiation, purification and product finishing. With the pending delivery of our metallurgical bulk samples, collected from the current air-core drilling programme, we will be able to upscale the bench scale testwork to include industry scale testing and look to commence the engineering work necessary for the design of the pilot plant."

Product Development Testwork

Development of the overall process flowsheet continues to advance, with the metallurgical testwork currently focused on producing a high-purity TiO₂ product. As recently announced (13 February 2025) the upfront ore processing, mineral separation and mineral concentrate leaching stages of the process flowsheet have now been tested and proven to be effective for recovering anatase and rutile into a leach liquor. The important next step in the process aimed to recover the titanium from the leach liquor, as a high-grade, saleable product (Figure 1).



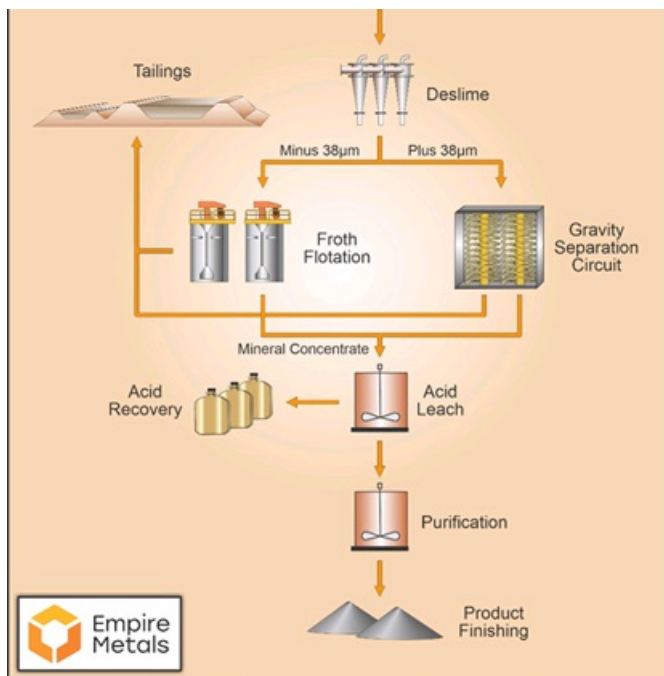


Figure 1. Conceptual Flowsheet for the Pitfield Titanium Project.

Samples of in-situ weathered mineralisation from the diamond drill core programme carried out in February - March 2024 (results announced 28 May 2024) were selected from a continuous interval of drill core. Quarter core was coarse crushed and blended to produce a composite sample for testing. A subsample was taken forward for further comminution prior to a deslimes stage. A screen was used to split the sample at 38µm. Material coarser than 38µm was then processed over a wet gravity shaking table in a single pass. Material finer than 38µm was filtered prior to high intensity conditioning and a single rougher froth flotation step.

Conventional operating conditions for the gravity recovery stage were used to produce a titanium mineral concentrate from the coarse fraction. For the froth flotation stage, the fine fraction was processed using reagents and physical conditions similar to that applied in the kaolinite industry, where reverse flotation is used to recover anatase from the kaolinite products.

The wet gravity shaking table concentrates and flotation concentrates were taken forward for hydrometallurgical testwork. An acid bake-water leach process using sulphuric acid was applied, with testwork parameters selected from several research references papers on the subject. In this process step the titanium is recovered from the mineral concentrates into the liquor as titanyl sulphate (TiSO_4) and the residue solids and liquor are then separated after the water leach step, using filtration, with the liquor moving forward for purification and product finishing testwork.

The liquor purification stage testwork at this preliminary stage, was solely focused on iron removal, converting ferrous (Fe^{3+}) to ferric (Fe^{2+}). A hydrolysis stage followed, involving the heating of the liquor, which broke down the titanyl sulphate, resulting in the production of hydrated TiO_2 and H_2SO_4 .

Finally, as part of the product finishing stage, the hydrated TiO_2 was separated from the liquor using a centrifuge, and the solids were then calcined to remove water and produce a high-purity TiO_2 compound.

The purification and product finishing steps were not optimized due to the small volume of leach liquor available for testing at this early stage of development. Two additional, larger samples are currently being tested through this process to improve metallurgical performance and product quality. Further testwork campaigns, on the metallurgical bulk samples currently being collected from the in-situ weathered cap (announced 17 February 2025), will be carried out over the coming months and a bulk product sample will be produced for marketing purposes.

The TiO_2 product purification and product finishing stages were tested at ALS Metallurgy laboratories, located locally in Perth, Western Australia. All assays were undertaken at ALS Metallurgy by their in-house metallurgy specific assay lab.

The product under development was assayed using XRF and contained 91.6% TiQ_2 . The overall analysis confirmed the purity of the Pitfield ores with extremely low levels of deleterious elements such as uranium, thorium, vanadium and chromium (refer Table 1). These results are extremely encouraging, particularly so given that the testwork was the

Company's first attempt at producing a finished product and not all of the purification and product finishing steps have yet been applied.

Product Analysis (XRF)	%
TiO ₂	91.6
Al	0.77
Ca	0.1
Fe	1.33
La	<0.01
Nd	<0.01
Pb	<0.001
P	0.26
Si	1.15
Th	0.001
U	<0.001
V	0.004

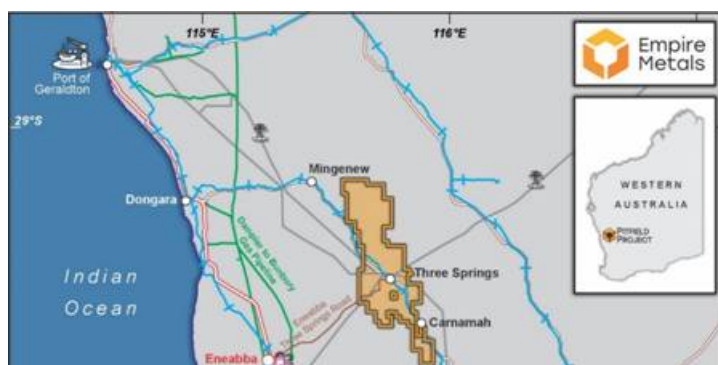
Table 1. Finished Product Analysis



Figure 2. Purification and product finishing testwork, photos from left to right: titanyl sulphate solution from leaching stage, hydrated TiO₂ produced from hydrolysis, and the calcined TiO₂ product.

The Pitfield Titanium Project

Located within the Mid-West region of Western Australia, near the northern wheatbelt town of Three Springs, the Pitfield titanium project lies 313km north of Perth and 156km southeast of Geraldton, the Mid West region's capital and major port. Western Australia is ranked as one of the top mining jurisdictions in the world according to the Fraser Institute's Investment Attractiveness Index published in 2023, and has mining-friendly policies, stable government, transparency, and advanced technology expertise. Pitfield has existing connections to port (both road & rail), HV power substations, and is nearby to natural gas pipelines as well as a green energy hydrogen fuel hub, which is under planning and development (refer Figure 3).



The Exploration Target* covers an area less than 20% of the overall mineral system at Pitfield which demonstrates the potential for significant further upside.

*The potential quantity and grade of the Exploration Target is conceptual in nature. There has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource. See RNS dated 12 June 2024 for full details.

Empire is now accelerating the economic development of Pitfield, with a vision to produce a high-value titanium metal or pigment quality product at Pitfield, to realise the full value potential of this exceptional deposit.

The Company also has two further exploration projects in Australia; the Eclipse Project and the Walton Project in Western Australia, in addition to three precious metals projects located in a historically high-grade gold producing region of Austria.

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