

SUCCESS STORY

NEW HIGH-EFFICIENCY SEPARATION PROCESS FOR RESIDUAL POWDER RECOVERY

AP&C, a global leader that primarily serves the biomedical and aerospace markets, has produced metal powder using alloys from three critical and strategic minerals (CSM): titanium (Ti), nickel (Ni), and niobium (Nb). The powder production is intended for additive manufacturing (AM), a technique that systematically generates by-products in the form of powders with a particle size too fine for commercial use. The atomized metal powder by-products were previously discarded as hazardous metal residue by AP&C, but this project will enable the company to recover two thirds of these by-products at its two production sites in Boisbriand and Saint-Eustache, an amount equal to approximately 40,000 kg of residue per year. The new process seeks to better isolate the saleable portion of powder by-products for the AM sector while facilitating the development of new value-added products for the powder metallurgy sector. Thanks to its physical properties and biocompatibility, Ti has become the preferred material when manufacturing various types of biomedical prostheses and aerospace components. Among other things, the project intends to adapt the fine powder product (5-20 microns) for use in metal injection moulding (MIM) processes by reducing its oxygen content, thus complying with Grade 5 requirements following the MIM stage. Already well established in the Ti biomedical and aerospace supply chains, the project will significantly bolster the electronic components sector (mobile phone casings), where this CSM has yet to establish itself. These technological solutions will be applicable across the entire value chain for this particular market.

*« The research and development team's ability to handle the financial planning, Gantt charts and ROI analyses, among other things, provided a fantastic opportunity. **Good planning for a low-maturity project provides an excellent springboard to the next TRL.** »*

- Christian Caron,
Senior Engineer,
Program Integration,
AP&C

SUCCESS STORY (CONTINUATION)

The project provided an excellent opportunity to develop the company's expertise in advanced processing methods when separating metal powders. Results include improvements in productivity, residue recovery, and environmental performance.

The work led to the transfer of cutting-edge knowledge from the R&D team to the internal production team in the field of metal powders for additive manufacturing and powder metallurgy. This transfer is evident for both process development and product development.

From an economic standpoint, the project's advanced maturity has allowed large-scale production to begin in an effort to assess the actual potential of resource recovery. In the short term, approximately 10 annual tonnes of titanium powders will no longer be destroyed but made available on the AM market. The potential is also very high for other materials, such as nickel. These new skills, combined with a globally recognized expertise in metal powder production and handling methods for the biomedical and aerospace sectors, will help the company maintain its leadership and increase sales.

The project created two new jobs while maintaining five previous ones, including the R&D engineers and designers who devoted most of their time to this project over the past two years.



SECTORS

Environment,
Additive Manufacturing,
Powder Metallurgy



APPLICATIONS

Biomedical prostheses,
aerospace components,
and the reuse of
electronics



TRL

Start 3, end 9



DURATION

24 months
(2024-2026)