

VBN Components enables wear-resistant AM integration in large slurry pumps

VBN Components, in collaboration with a major pump manufacturer, has successfully demonstrated a new method for integrating additively manufactured (AM) cemented carbide into large-scale cast components. By casting directly onto Vibenite® 480, the solution enables a step-change in wear resistance for slurry pumps or other casted equipment — without the need to manufacture full size components additively.

The breakthrough is made possible by introducing a Vibenite® Nucleation Net Zone (VNNZ) during the 3D printing process. This engineered interface allows high chromium cast iron to bond effectively to the extremely wear-resistant Vibenite® 480 during casting.

Wear testing in representative slurry pump environments shows that Vibenite® 480 delivers exceptional performance, with erosive wear resistance approximately 10 times higher than high chromium cast iron and about 100 times higher than hardened steel plate.

While these properties are well established, the size limitations of current metal AM systems make it impractical to print meter-scale pump housings. This has driven the development of a hybrid approach: placing smaller, strategically designed AM components in the most exposed wear zones within a casting mold.

Without the VNNZ, molten cast iron tends to melt or intermix with the printed inserts, compromising both geometry and material performance. The VNNZ eliminates this issue, ensuring structural integrity and strong metallurgical bonding during casting.

Following successful trials, the technology will now be verified in full-scale slurry pump housings, targeting the most critical wear areas. The approach is flexible, allowing for wear components of virtually any geometry—not limited to flat plates.

By enabling precise placement of Vibenite® 480 only where it is needed, this method provides a scalable and cost-efficient route to significantly extended component lifetime in demanding expensive applications.

“-This is an exciting development for our additive manufacturing technology. We are demonstrating how the superior wear resistance of Vibenite® 480 can be integrated into large industrial components in a practical and scalable way—combining material performance with the design freedom of AM. It opens up significant new business opportunities,” says Dr Ulrik Beste, CTO of VBN Components.



Printing a nucleation net zone in Vibenite® 480 is simple, yet it enables precise placement of the wear resistant material inside the mold at the most critical positions—significantly extending pump lifetime.

For further information please contact:

Beatrice Woolford
Administrator, VBN Components AB
Cell phone: +46(0)72 23 60 165
Email: beatrice.woolford@vbncomponents.com
Switchboard: +46 (0)76 007 79 42
Website: www.vbncomponents.com

About VBN Components AB

VBN Components AB is a Swedish materials development company, focused on high performance metals for Additive Manufacturing. The material brand name Vibenite® stands for extreme wear resistance, heat resistance and complex shapes. The company sells additively manufactured components in near-net-shape, as well as serial production and license solutions.

The company has won numerous innovation awards, among which the SKAPA Award in memory of Alfred Nobel. VBN is an alumnus from Uppsala Innovation Centre, ranked as the world's 5th best business incubator according to UBI Global. In 2017 VBN launched the world's hardest steel Vibenite® 290 and in 2018 the world's first 3D printed cemented carbide Vibenite® 480. In 2023, the company 3D-printed a memorial plaquet to honor the Swedish King Carl XVI Gustaf, which now could be seen in Uppsala next to Dag Hammarskjölds' bust and the Uppsala Castle.

Vibenite® is a registered trademark of VBN Components AB.