



PRESS RELEASE 28 November 2017

Swedish Company Launches World's Hardest Steel

Steel that does not need forging or machining to turn into a finished product. The hardest and most wear-resistant metal on the market. Any shape you wish can be produced. And as a bonus, considerably less material is consumed. Swedish company VBN Components continues to make steel history.

VBN Components is launching the world's hardest near-net-shape steel; Vibenite® 290. The hardness of the alloy, plus its high carbide content, make it a realistic alternative to cemented carbides for numerous applications that demand high resistance to both wear and heat. The additive technology of Vibenite® 290 enables complex and smart shapes.

"We interact daily with customers who have very specific requirements regarding materials performance concerning wear and heat resistance. To meet their needs, we have developed a material with excellent qualities, and which can be ordered in near-net-shape", says Martin Nilsson, CEO of VBN Components.

A replacement for cemented carbides

Vibenite® 290 alloy is highly wear and heat-resistant and contains a high proportion of carbides; around twenty-five volume percent in fully-hardened condition. This high carbide content makes the material a strong candidate for replacing cemented carbides in many situations, especially for larger details with complex designs. Furthermore, the alloy's unique properties make it suitable for any type of application where erosion and abrasion are present, especially when adapted to metal cutting tools, for example.

Typical users come up against numerous obstacles to finding the ideal material for their tools and components. They traditionally face the need to first forge and roll metal bars that, following heavy logistics, are finally drilled, milled and turned. With additive technology, VBN makes this whole process obsolete. The result is higher efficiency for the user and, thanks to the material's greater wear resistance, substantially increased product efficiency and life-span.

"The limitations of traditionally-made products result in a compromise. Instead of choosing the material best-suited to the product in mind, producers are instead forced to use a material that they can process. By focusing on material performance, we turn this completely around", says Ulrik Beste, CTO of VBN.

VBN Components has been producing extremely hard and wear-resistant steel products using this technique for many years. Step-by-step, the company has moved towards what is today the world's hardest steel – a milestone in materials development. The need for less material in both end-use and manufacturing is one of the reasons why environmental impact is reduced by 90% compared to traditional industry (according to tests at one large Swedish company).

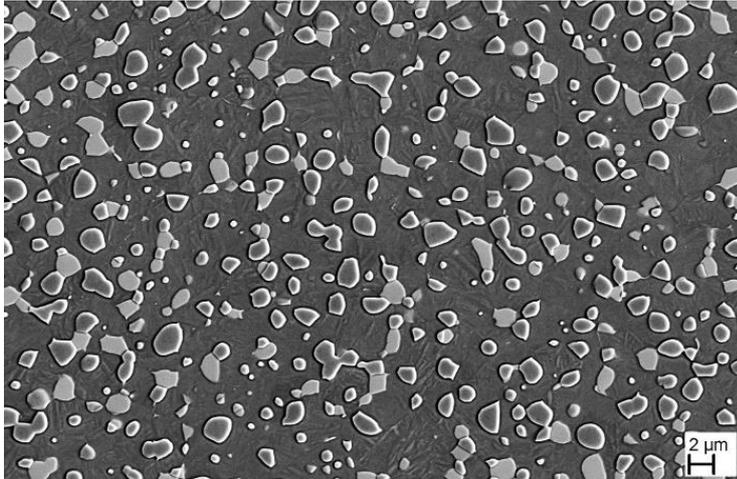
"We have shown in a customer test that this product lasts many times longer than before. And we know that even higher performance is possible", states Ulrik Beste.

Facts Vibenite® 290:

Hardness: 68-72 HRC (depends on the hardening, i.e. component size and cooling speed).

Proportion of carbides: Approx. 25 vol. % in fully-hardened condition.

Pore-free with extremely low oxygen content.



Caption: Micro-structure of the world's hardest commercially-available steel – Vibenite® 290. A hard, heat-resistant martensitic matrix with a high proportion of carbides for extreme wear resistance.



Caption: Additively manufactured shaper cutter with high wear resistance.

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VBN Components in brief

VBN Components AB is a frontline materials development company that manufactures wear-resistant metal components directly from powder, so-called 3D-printing (additive manufacturing, free forming). The company,

which has won numerous awards, is conducting a range of important customized projects to improve the competitiveness of the engineering industry. An alumnus from Uppsala Innovation Centre, ranked as the world's 10th best business incubator, VBN is supported by the Swedish Energy Agency. The company provides Near-Net-Shape components branded Vibenite® to clients needing metal components with high complexity and/or extreme wear-resistance. www.vbncomponents.com