

NITROVAN® VANADIUM

Nitrovan® vanadium is an efficient vanadium-nitrogen product that can significantly lower the strengthening costs of high-strength, low-alloy (HSLA) and other alloy steels. When vanadium and nitrogen combine in the steel structure, they increase steel strengths more than vanadium by itself. That allows steelmakers to reduce the amount of vanadium needed to meet strength specifications of the final product. Reducing vanadium additions can lower strengthening costs by as much as 40%, depending on individual steelmaking practices and strength requirements. In fact, over the past 25 years, cost-conscious steelmakers around the world have saved well over 100 million dollars by using Nitrovan® vanadium.

In addition, Nitrovan® vanadium is available as briquettes that are packed in strong, moisture-resistant bags that can be added directly to molten steel in the ladle. The use of bags eliminates handling losses and simplifies weighing and inventory control.

Nitrovan® Vanadium is produced by Bushveld Vametco Alloys (Pty.) Ltd. in South Africa and marketed by Wogen Resources LTD based in London UK.

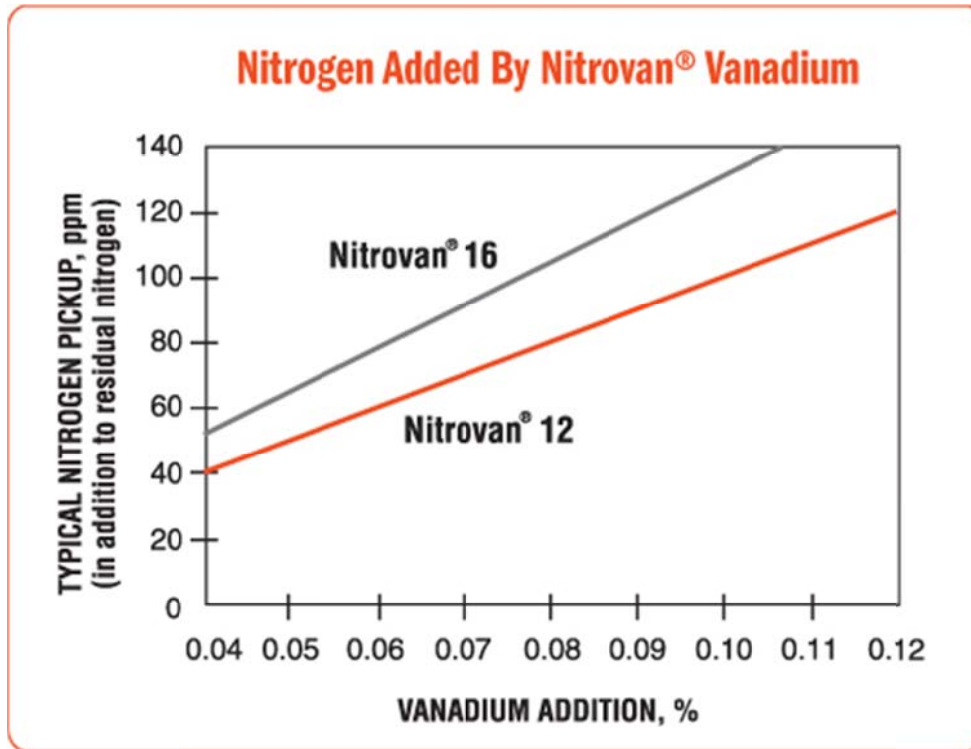
Bushveld Vametco technical personnel are available to answer technical questions on Nitrovan® Vanadium and work with steelmakers to optimize the use of this product in individual practices.

Application of Nitrovan® Vanadium

High-Strength Weldable Rebars	High strengths with 20 to 40% less vanadium.
Structural Shapes	Good strength and toughness at finishing temperatures similar to carbon steel.
Structural Plates	No controlled rolling needed to obtain required properties; good toughness and weldability.
Hot-Rolled Strip	High strengths with 35 to 40% less vanadium in steels made by conventional or thin-slab technology; improved gauge and shape control when rolling strip less than 2-mm (0.08-in.) thick.
Seamless Tubes	Excellent strength and toughness in as-rolled tubes, eliminating expensive normalizing treatment.
Microalloyed Forgings	Dependable vanadium and nitrogen strengthening provides properties comparable to quench-and-tempered steels; improved machinability at considerable cost savings.
High-Strength Bars	High yield strengths achieved consistently from vanadium-nitride precipitation at all carbon levels and in large-diameter bars.
High-Speed Tool Steel	Improved hot workability and favorable carbide distribution with increased Rockwell hardness.

TAILORING NITROGEN TO YOUR PRACTICE

Steelmakers using Nitrovan® vanadium have a choice of two vanadium-to-nitrogen ratios. As shown in the chart, Nitrovan® 16 vanadium introduces 30% more nitrogen than Nitrovan® 12. The low-carbon content of Nitrovan® 16 is also an advantage in low-carbon steels.



NO HANDLING LOSSES

Briquettes of Nitrovan® vanadium are packed in strong, moisture-resistant bags that can be added directly to steel. The use of bags eliminates handling losses and simplifies weighing and inventory control.

LOW RESIDUAL PICKUP

Nitrovan® vanadium is a high-purity product with low levels of residual elements. Its aluminum content is particularly low compared to ferrovanadium.

HOW TO MAXIMIZE RECOVERIES

Nitrovan® vanadium should be added to molten steel in the same manner as ferrovanadium. Maximum vanadium recoveries are obtained by adding Nitrovan® vanadium after adding deoxidants such as aluminum and ferrosilicon. Aggressive agitation of the steel prevents localized super-saturation of nitrogen and leads to high-nitrogen recoveries. Additions during tapping should be made before the ladle is around 1/3 full.

Nitrovan® vanadium may also be added directly to the steel in the ladle furnace through an opening in the slag. Stirring during the addition will help dissolution and nitrogen recoveries. A reducing slag will also benefit vanadium recoveries. If vacuum degassing is used, maximum retention of nitrogen can be obtained if Nitrovan® vanadium is added at atmospheric pressure after degassing.