V Strength

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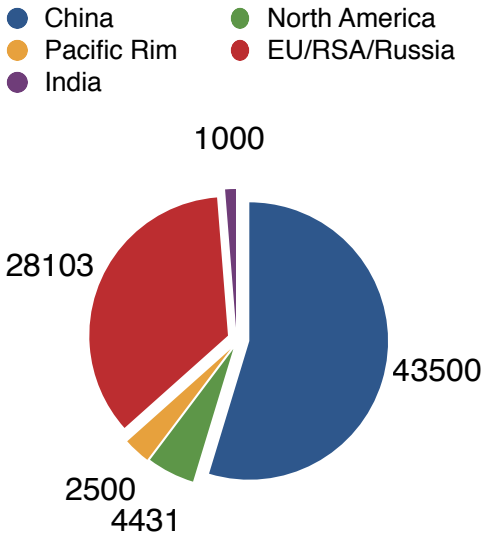
Vanitec

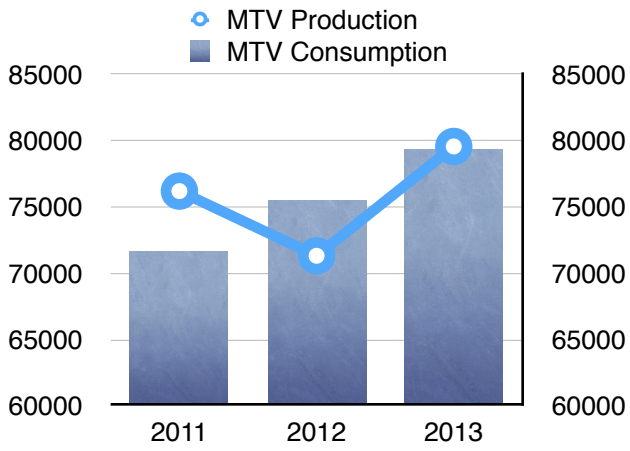
GLOBAL RESOURCE FOR VANADIUM TECHNOLOGY

2013 Vanadium Consumption Grows Worldwide

Full year 2013 production and consumption statistics were recently released by Vanitec on its website showing 2013 worldwide production at 79,534 and consumption at 79,300 metric tons of vanadium. Global figures from 2011 to the present are also available.



2013 Worldwide MTV Production



Global production of vanadium bounced back to 79,534 MTV in 2013 from a level of 71,289 in 2012 and 76,166 in 2011. Leading the way was China where consumption grew to 43,500 MTV in 2013 from levels of 37,500 and 38,100 in 2012 and 2011 respectively.

Consumption was also stronger worldwide, up to 79,300 MTV in 2013 from 75,500 in 2012 and 71,700 in 2011. Again China was the consumption leader with 35,500 MTV consumed in 2013, compared to 30,400 in 2012.

Full details were made available at www.vanitec.org on production in the five global regions allowable under antitrust guidelines. Also included were more detailed consumption estimates for 11 separate worldwide regions.

In its reporting, Vanitec defines vanadium production as MTV in all oxides produced, plus MTV in other v-compounds not produced via oxide route, plus MTV FeV not produced via V2Ox-route.

The data is not disseminated by Vanitec nor used for any purpose other than compiling overall statistics for the vanadium industry.

"We envision that the Centre will be extremely beneficial to the development of Chinese steel operations"

- David Milbourn, CEO

Vanitec Opens China Technology Centre

David Milbourn was pleased to open the VANITEC-CISRI Vanadium Technology Centre in Beijing, China during the 85th Vanitec Meeting and Seminar from 25-27 September, 2013.

Mr. Zhou Kang, the deputy general manager of China Iron & Steel Research Institute Group Co., Ltd. chaired the meeting. The Vanadium Technology Centre was inaugurated by David Milbourn, CEO of Vanitec and Mr. Zhao Kang. Commenting on the launching of the Centre, Mr. David Milbourn, CEO of Vanitec said, "The purpose of having a Vanadium Technology Centre in CISRI is to strengthen the prominence and visibility of vanadium technology, while also having an influential and exclusive venue to conduct research projects and promote the applications of vanadium containing products. The advantages of vanadium can be fully exploited in China, which has the world's highest production and consumption levels of vanadium. Overall, we envision that the Centre will be extremely beneficial to the development of Chinese steel operations."

At the meeting, Professor Yang Caifu, head of the Centre and Director of Structural Materials Institute, CISRI, introduced the organizational structure, the expert committee and the future goals and major tasks of the Centre.

Mr. Zhou Kang and Mr. David Milbourn

According to Professor Yang's presentation, it is expected that by 2015 China's vanadium containing steel production will reach 100 million tones and vanadium consumption will be about 50,000 tonnes.

Monograph Update

An update to "The Role of Vanadium in Microalloyed Steels" is intended to provide a high quality, credible and contemporary review and reference on the best means of utilizing vanadium as an alloy for improving the quality of structural steel products.

The original monograph was published in 1999 by Lagenborg and co-workers at the Swedish Institute for Metals Research with initial funding provided by Stratcor.

Swerea KIMAB is leading the update and anticipates publication in the fall in order to be included as source material at the Michael Korchynsky Symposium held at the 2014 MS&T Conference in October, 2014.

Michael Korchynsky Symposium Planned

The MS&T Conference 12-16 October, 2014 will include: Vanadium Microalloyed Steels: A Symposium in Memory of Michael Korchynsky.

The potential for applications of microalloyed steels is constantly increasing, yet processing, alloy design, and manufacturing challenges remain. The attractive balance of properties offered by vanadium microalloyed steels is derived from an advanced understanding of the optimization of microstructure through the controlled interaction between alloying and processing. The scope of this international symposium is intended to include microalloyed sheet, plate, tubular, and long products.

MS&T14®

Vanitec to Cosponsor HSE Symposium

As part of its ongoing commitment to the health and safety of its workers, and the environment, Vanitec has agreed to once again cosponsor the 9th Vanadium Sympisum (V9) to be held 29 June through 2 July in Padova, Italy. Vanitec HSE Committee members, scientists and consultants will present an array of presentations and posters outlining their most recent research findings.

UNIVERSITÀ DEGLI STUDI DI PADOVA

New Member

IMERGY™ POWER SYSTEMS

Vanitec recently welcomed a new Associate Member to its ranks. Imergy Power Systems is a leading manufacturer of groundbreaking systems for storing and sharing power. Their Energy Storage Platform consists of a proprietary, low cost, vanadium redox flow battery ranging from 2.5kW up to 250kW. Imergy is headquartered in Fremont, CA, United States.

Members

American Vanadium Corporation

AMG Vanadium

Bear Metallurgical Company

Chengde Iron & Steel Group

China Iron & Steel Research Institute

Evraz Group

- East Metals North America
- Evraz Stratcor
- Evraz Highveld Steel & Vanadium Corp.
- JSC Evraz NTMK
- JSC Evraz Vanady-Tula

Gulf Chemical & Metallurgical Corp.

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Largo Resources Ltd.

Masterloy Products Company

Mustavaaran Kaivos Oy

New Zealand Steel

Riverside Specialty Chemicals

Panzhihua Iron & Steel Group

Scandinavian Steel AB

Treibacher Industrie AG

Ural Institute of Metals

TTP Squared

VandiumCorp

Vanchem Vanadium Products (Pty)

Xstrata

Yellow Rock Resources

UPCOMING EVENTS

9th International Vanadium Symposium

Padova, Italy
29 June - 2 July

CISRI Progress & Review

Beijing, China
8 August

86th Vanitec PPP & MDC Meeting

London, UK
TBD

87th Vanitec Meeing

Fall
Location TBD

MS&T 2014 with Korchynsky Symposium

Pittsburgh, PA
12-16 October

Symposium on Microalloyed Forging Steels

China
November

Hydrogen in Metals "HEmS" Project Kicks off in UK

Vanitec has joined with several universities and industrial partners on a 5 year £5.48 million project, funded by UK Engineering & Physical Sciences Research Council (EPSRC). The vision is of a renewed confidence in metallurgical materials engineering in which the risks of hydrogen induced damage no longer impose constraints upon the use of the strongest, toughest alloys such as vanadium.

Hydrogen embrittlement (HE) is a common problem in ultra-strong steels. It reduces the durability of alloys, components and complex engineering systems on which challenging performance demands are posed. It is known that the higher the strength of steel, the more prone it is to HE.

One way to address the problem is through the introduction of hydrogen microstructure traps which immobilise H and strongly decrease its damaging effects. Vanadium precipitates have been shown to effectively immobilise H under certain conditions, however several other phases may also be engineered to control H mobility.

Vanitec is funding a PhD studentship for three years including meeting attendance.

A team of internationally leading researchers has been assembled with complimentary expertise in alloy design, characterization and materials modeling, spanning all length scales from atomitsic to the continuum to develop new scientifically based strategies for the design of a new generation of steels that are resistant to HE.

Vehicles will be lighter and more energy efficient. Wind turbines will last longer and require less maintenance in aggressive off-shore environments. Hydrogen will be safely and easily stored, transported and managed.

The research program will be divided into 4 work packages. The initial package will investigate Microstructural Design Against HE and will be lead by Professor Pedro Rivera del Castillo at the SKF (a bearing steel manufacturer) and the University Technology Centre at Cambridge. The work package has three objectives:

- Employ microstructural modelling techniques to conceive novel steels resistant to HE
- Computationally describe the HE mechanisms in advanced steels by prescribing their plasticity response
- Demonstrate that the designed steels are resistant to HE through the prescribed mechanisms.

UNIVERSITY OF OXFORD

UNIVERSITY OF CAMBRIDGE

KING'S College LONDON

The University Of Sheffield.

EPSRC
Pioneering research and skills

Vanitec

Vanitec is a technical and scientific committee (The Vanadium International Technical Committee), which brings together representatives of companies and organisations involved in the mining, processing, manufacture, research and use of vanadium and vanadium-containing products.

The objective of Vanitec is to promote the use of vanadium bearing materials and thereby to increase the consumption of vanadium across the range of steel, titanium and chemical applications.

Vanitec strives to provide those with a vested interest in Vanadium – users, educators, students, producers – convenient access to research, events, resources and publications regarding Vanadium.