V Strength

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VANITEC
TRANSFORMING POSSIBILITIES

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Vanitec Promotes Vanadium Consumption

Vanitec enters 2019 with an expansion of its TRANSFORM program and a new focus on technical research, customer outreach, as well as a global communications and reputation-building campaign plan.

In recent years Vanitec has started a new effort entitled the "TRANSFORM" project which seeks to further engage the steel industry and thus develop potential growth opportunities and enhance the position of vanadium. The goal of the program is to inform and enhance technical research, publications and projects that Vanitec has undertaken since its inception.

Initial efforts, the SEARCH phase of the project, focused on gathering, segmenting, and analyzing consumption data from vanadium users. The next phase, called SUPPORT, is geared toward using the data from the first phase to help focus future research funding and to all for greater dialogue and relationships with the steel industry and other vanadium experts and advocates.

In January 2019 Vanitec announced the hiring of Dr. David Crowther as a technical consultant to coordinate and communicate positive technical information about the use of vanadium in steel, encourage others to do the same, and work with PR/ Marketing efforts to raise the profile of vanadium & Vanitec.

In his first months Dr. Crowther will be focused on reviewing the current slate of projects and efforts, and meeting with vanadium researchers. Future efforts will include customer meetings with steel mills and users.

Dr. Crowther has a PhD in the Hot Ductility of Steels from the City University of London and was most recently the Knowledge Group Leader at Tata Steel Research and Development, Swinden Technology Centre.

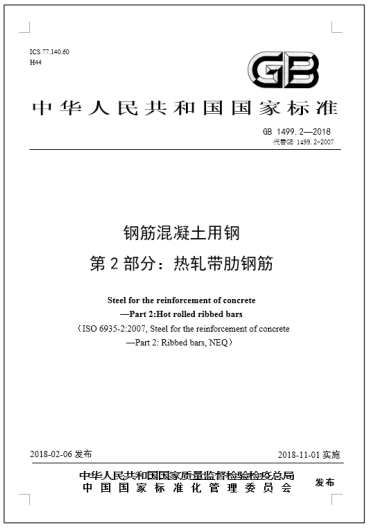
Vanitec also took the decision to design a marketing plan for vanadium more broadly, including Vanitec's role in promoting this critical metal and all its applications. Four objectives drove the commissioning of a marketing plan:

1. Supporting the global consumption of vanadium by raising awareness of its strengths and applications;
2. Advancing the reputation of vanadium and its impact as a "green" metal;
3. Positioning Vanitec has a key influencer; and
4. Growing Vanitec's membership base.

Based on their successful implementation of a plan for the Vanitec Energy Storage Committee, Lifa Communications was hired to develop a global vanadium marketing plan. The plan is based off interviews with individual professionals, benchmarking against other metals associations, and better understanding the positive impacts of vanadium and vanadium-vanadium-based products. The 2019 plan will focus on a digital strategy, press releases and outreach to international bodies, and strengthening vanadium and Vanitec's visibility at events and conferences.

"We joined Vanitec for the valuable statistical data, the information on HSE issues, and the opportunities for direct contact with other members during the Vanitec meetings. Together these enable and inside and up-to-date understanding of the vanadium market. which is essential to any new participant in the vanadium sector."
- Jan Akkerman, Ferrovan Oy

New Chinese Rebar Standard in Full Force


ICS 77.140.60
H44

GB

中华人民共和国国家标准

GB 1499.2—2018
代替GB 1499.2-2007

钢筋混凝土用钢
第 2 部分：热轧带肋钢筋

Steel for the reinforcement of concrete
—Part 2:Hot rolled ribbed bars
(ISO 6935-2:2007, Steel for the reinforcement of concrete
—Part 2: Ribbed bars, NEQ)

2018-02-06 发布　　2018-11-01 实施

中华人民共和国国家质量监督检验检疫总局
中国国家标准化管理委员会　发布

The new rebar standard GB/T 1499.2-2018 has been officially implemented in China since 1 November 2018 and already has widespread adoption by Chinese rebar producers.

The new rebar standard eliminates low strength Grade 2 (335MPa) rebar and authorizes 3 different high strength standards: Grade 3 (400MPa), Grade 4 (500MPa), and Grade 5 (600MPa).

Professor Yang Caifu, of the Chinese Central Iron & Steel Research Institute (CIRSI) who leads the joint Vanitec/CISRI Vanadium Technology Centre noted that "for hot-rolled HS rebar, V content will be at 0.03% V in Grade 3, 0.06% V in Grade 4, and more than 0.1% in Grade 5 rebar so the implementation of the new standard will significantly promote the application of vanadium in Chinese rebar products."

A recent survey of nearly 200 Chinese rebar producers by Mysteel has shown that 89% of the rebar producers have adopted vanadium microalloying to meet the requirements of the new rebar standard. Those producers noted that the production of vanadium microalloyed high strength rebar is very straightforward and vanadium microalloying offers the best combination of high strength, good ductility, bendability, easy of welding, mechanical joining and insensitivity to strain aging.

Vanitec Changing the Conversation on VRFBs

The Vanitec Energy Storage Committee (ESC) has reached the one year mark for the implementation of its marketing plan and has big ideas for 2019.

The ESC marketing plan was designed to put a spotlight on the exciting role vanadium is already playing in global energy storage, and to dispel any myths about vanadium, such as the perception that the VRFB is prohibitively expensive or misconceptions about the security of supply for vanadium. Over the last 12 months, the ESC marketing strategy delivered:

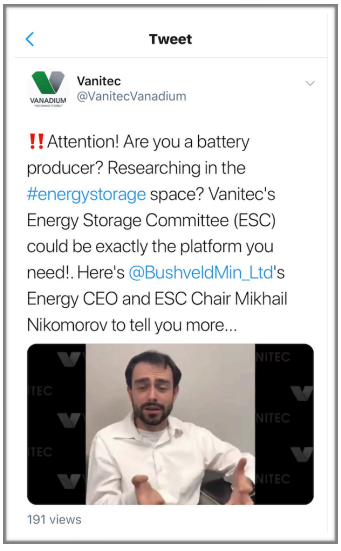
- A marketing guide for members on how to talk about VRFBs in a unified voice;
- An active Twitter feed which promotes information and stories about the deployment of VRFBs across the world (@VanitecVanadium's Twitter following has grown from 179 followers in November 2017 to 747 in November 2018);
- A series of short videos on 'Faces of Vanadium' talking about VRFBs and Vanitec's activities; and
- Press releases to a global network of journalists.

There has been a marked increase in the number of articles on the deployment of VRFBs across the world, and an increased standardised use of the name 'vanadium redox flow batteries' to describe the technology, which marks good progress, as previously there were multiple names used in communications.

The 4th ESC Meeting in Switzerland in July provided an excellent opportunity for the Energy Storage Committee to come together, assess progress, and devise strategies for the next steps of its marketing plan. In 2019, the ESC is looking to build on its strong position, and will place additional emphasis on connecting with governments and investors about vanadium's contribution to energy storage.

Key messages for 2019 will also need to proactively tackle any questions about the future of VRFB's, competitors, and health and safety issues.

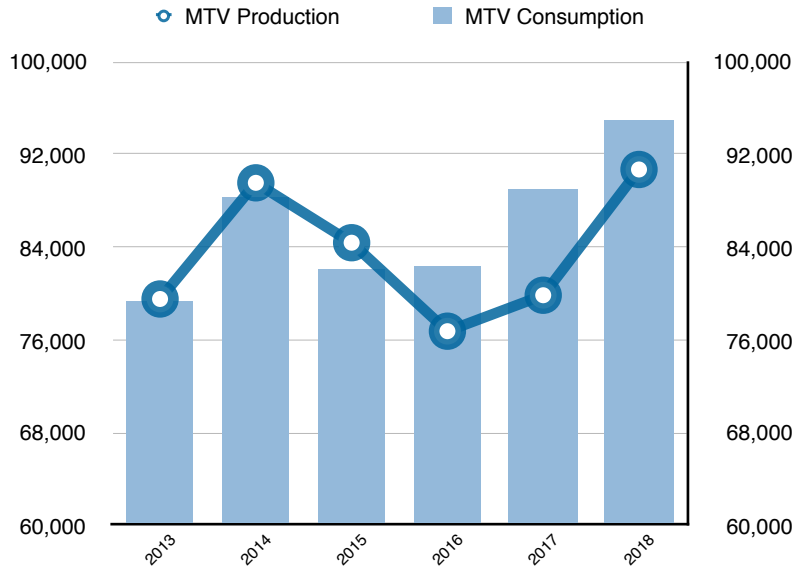
Visit Vanitec on Twitter @VanitecVanadium or follow the hashtag #vanadium to join the conversation.



V Production Increased Thru Q3 of 2018

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 V_2O_x-route. The data is not disseminated by Vanitec nor used for any purpose other than compiling overall statistics for the vanadium industry. The chart below is annualized based off of data through the 3rd quarter. Due to antitrust regulations, Vanitec only releases 90 day old historical data.

Detailed information such as individual region production, consumption and specific consumption rates are available to Vanitec members only. If you are interested in joining Vanitec as a full or associate member please contact us at info@Vanitec.org.



Vanitec Welcomes Two New Members

Vanitec is pleased to announce that Oxkem of Reading, UK and Technology Metals Australia of Western Australia have both been accepted as Associate Members of Vanitec Limited.

For more information on how to join and see the benefits of membership, please contact John Hilbert at john.hilbert@vanitec.org or check out our website at www.vanitec.org. Full membership is available to producers of vanadium and Associate Membership's are available to users,

TECHNOLOGY METALS AUSTRALIA LIMITED

OXKEM

Members

AMG Vanadium, Inc.

Atlantic Vanadium Pty Ltd.

Australian Vanadium

Bear Metallurgical Company

BlackRock Metals

Bushveld Vametco

HBIS Group Chengsteel Company

Chengde Jianlong Special Steel

China Iron & Steel Research Institute Group

Desheng Steel

Duferco S.A.

Energy Storage Solutions

Evraz NTMK

Evraz Vanady Tula

Ferrovan Oy

Glencore plc

Largo Resources Ltd.

New Zealand Steel Ltd.

Oxkem

Pangang Group

Queensland Energy & Minerals

Technology Metals Australia

Treibacher Industrie AG

U308 Corp

VanadiumCorp

Vanchem Vanadium Products Pty.

Wogen Resources Ltd

UPCOMING EVENTS

95th Vanitec Projects & Publications Panel

Conference Call
21 March, 2019

96th Vanitec Meeting

Xichang, China
9-11 April, 2019

4th Intl Vanadium Forum

Chengdu, China
12-14 April, 2019

6th Vanitec ESC Meeting

Lyon, France
8 July, 2019

International Flow Battery Forum

Lyon, France
8-11 July, 2019

97th Vanitec Meeting

London, UK
8-9 October, 2019

Materials Science & Technology (MS&T) 2019

Oregon, USA
30 Sept -3 October, 2019

Vanitec ESC, HSE & MDC Conference Calls

Monthly

Vanitec and Canadian Partners Develop V DP980 Grade Steel

CanmetMATERIALS and Stelco Canada have partnered with Vanitec on a research project entitled "Development of a Robust Vanadium Alloyed DP980 Grade by Selective Strengthening of Ferrite." Industrial melts are scheduled to begin early in 2019.

STELCO
The Steel Company of Canada

This project carried out by CanmetMATERIALS seeks to develop industrial DP980 grades for vehicle light-weighting, improved safety and reduced emissions using the vanadium technology developed in a previous Vanitec project.

The "Vanadium Microalloying for Damage Resistant Ultra High Strength (>1GPa) Dual Phase Automotive Sheets" showed that vanadium additions dramatically reduces the ferrite grain size and the selective precipitation strengthening in ferrite allows the target strength to be met using lower martensite fractions than standard DP alloys.

In addition, the harder ferrite phase strengthened by fine V(C,N) precipitates reduces the influence of the martensite fraction on the mechanical properties and thus opens the continuous annealing processing window leading to a more robust product.

Vanadium microalloyed DP980 compositions were designed with objectives of minimising the intercritical annealing (IA) temperature and isothermal hold time to increase the annealing line productivity and reduce energy costs, and optimising the mechanical performance.

The vanadium microalloyed DP980 steels were cast, hot and cold rolled and annealed under both continuous annealing (CAL) and galvanising (GI/GA) conditions.

The steels have shown the capability to meet DP980 target and their tensile behaviour appears to confirm the high robustness of the vanadium technology with respect to variations in the intercritical annealing temperature.

Stelco Canada plans to make an industrial melt of the vanadium microalloyed DP grade in early 2019. Vanitec will financially support this industrial implementation of vanadium technology to a commercial AHSS product. If the industrial trial is successful, it is entirely probable that Stelco will attempt to transpose the vanadium technology across their range of AHSS strip products.

Natural Resources Canada | Ressources naturelles Canada

Canada

CanmetMATERIALS / CanmetMATÉRIAUX

VANITEC
TRANSFORMING POSSIBILITIES

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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.