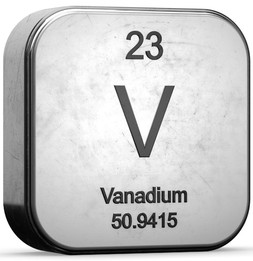
# VANADIUM

VANITEC
TRANSFORMING POSSIBILITIES

## A game changing micro-alloy in high strength steels

In line with the global trend towards making steels stronger, tougher, increasingly wear resistant, and more ductile, a detrimental phenomenon known as hydrogen embrittlement will become increasingly significant.




Vanadium – typically used as a micro-alloying agent in steel production – has also been shown to improve the resistance of steel to hydrogen embrittlement.

## THE STATUS QUO

Advancements in the production of higher strength and higher performance steels for use in ever-evolving industrial and commercial applications remains an area of active development for steelmakers around the world.

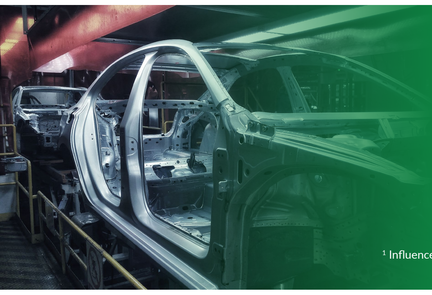
## THE CHALLENGE

Hydrogen embrittlement is a phenomenon that causes the deterioration of the mechanical properties of steel, such as ductility, resulting in the fracturing, cracking or failure of the steel over time.

## A POSSIBLE SOLUTION

Research suggests that the addition of a small amount of vanadium in high-strength steels can have beneficial effects in reducing hydrogen embrittlement in a number of situations.

## CASE STUDY #1



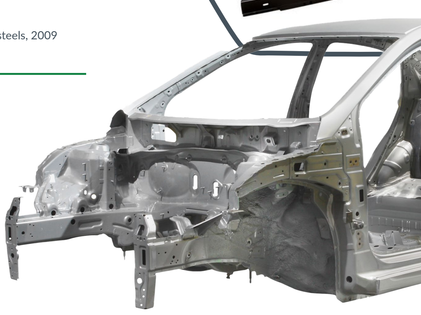
Research to date has found that the addition of vanadium is able to reduce hydrogen embrittlement in aluminized ultra-high strength press hardening steels with tensile strengths between 1,800 and 2,000 MPa[1]

[1] Influence of vanadium on the hydrogen embrittlement of aluminized ultra-high strength press hardening steel, 2018

## CASE STUDY #2

Research indicates that microalloying high manganese austenitic twinning-induced plasticity (TWIP) cold strips with vanadium and nitrogen provides increased resistance to delayed cracking[2]

[2] Vanadium additions in new ultra-high strength and ductility steels, 2009



## A FUTURE OPPORTUNITY FOR VANADIUM IN STEEL

As steelmakers continue to actively develop advanced high-strength steels (AHSS) and ultra-high strength steel (UHSS) – which are new generation of steels that provide high-strength (up to 2,000 MPa) and durability while maintaining formability – there is an opportunity to explore ways to incorporate vanadium into these types of steels,specifically for automotive applications, but also in long products.