



H2fit heavy plates for hydrogen application

Being part of the green future

Globally increasing energy demand and the governmental efforts to reduce the emission of greenhouse gases is generating a growing demand for an alternative energy source. Sustainably produced - green hydrogen builds the basis for the energy revolution.

Being part of this sustainable future, voestalpine Grobblech is providing a variety of high quality steel grades for the entire hydrogen value chain.

The state-of-the-art production of voestalpine, using the LD-process, calcium treatment and vacuum degassing during the steelmaking process ensures highest purity of the steel as well as lowest levels of sulfur and phosphorus. Our most advanced slab casting technology, utilizing a dynamic soft reduction, guarantees the highest slab quality minimizing center segregations.

The so established best practice production route minimizes the appearance of local discontinuity within the microstructure, thus lowering the sensitivity for hydrogen embrittlement.

Our high-quality products can be found as pressure vessel plates in the refinery for reactors, large-scale H2 tanks or as linepipe plates for the distribution for gaseous hydrogen.

For the most stringent requirements, we also offer our HIC & SSC resistant steels in accordance to all relevant specifications like: Shell, Axens, Total, SAMSS 016 or Petrobras.

Convincing advantages

- » Purest steel analyses & Calcium treatment
- » Soft reduction & minimum segregation
- » Highest level of HIC resistance
- » Accordance to all renowned specifications



PREMIUM QUALITY
WITH REDUCED
CARBON FOOTPRINT

Fit for hydrogen

Depending on your actual requirements, voestalpine Grobblech GmbH offers a tailor-made solution to fit perfectly for your application.

In accordance with your individual specification, you are able to choose the adequate material concept, whether for the safe and reliable hydrogen distribution via a pipeline, the storage of H₂ in a large-scale tank, for process piping in hydrogen atmosphere or for reactor columns in most severe and corrosive environment.

voestalpine Grobblech's new H2fit heavy plate product family is the right choice.

H2fit basic

H2fit basic heavy plates are characterized by a very low content of phosphorus or sulfur. Thanks to our state of the art steel-work-route and utilizing an intense vacuum degassing practice these unfavourable residual elements can be reduced to a minimum. Furthermore our slabs are produced with the latest strand-cast-technology. The dynamic soft reduction as part of our slab casting process enable to minimize center segregations of the so produced high-quality slabs.

H2fit basic heavy plates typically find their application at low pressure and low temperature in pure H₂ environment such as for transition or distribution pipelines or large-scale H₂ storage tanks.

H2fit classic

Our classical steel grades for sour service H2fit classic show an outstanding resistance against hydrogen induced cracking (HIC). In addition to a very low content of residual elements and the soft reduction, these particular steel grades undergo a special treatment in our steel plant. By treating the liquid steel with a calcium-silicon wire, the inclusion shape can be controlled.

The classic application for this type of plates are e.g. H₂ buffer tanks, columns and piping at medium pressure and temperature as well as in sour atmosphere.

H2fit severe

When it comes to severe operating conditions like high temperature and pressure in combination with a sour and corrosive environment, H2fit severe is the right choice. The combination of our HIC resistant steel grades and a stainless steel clad layer even allows for applications like reactors or piping in the H₂ processing industry.

Application matrix for hydrogen

	H2fit basic	H2fit classic			H2fit severe	
		HIC class 3 CLR 15	HIC class 2 CLR 10	HIC class 1 CLR 5	Clad	Clad + HIC
	Low pressure			High pressure		
	Low temperature			High temperature		
Low residual elements	✓	✓	✓	✓	✓	✓
Vacuum degassing	✓	✓	✓	✓	✓	✓
Dynamic soft reduction	✓	✓	✓	✓	✓	✓
Corrosion resistance					✓	✓
HIC resistance		✓	✓	✓		✓
Typical application	Pipeline Storage tanks Pure H ₂ condition	Process piping Buffer tanks Pure H ₂ condition	Process piping Buffer tanks Pure H ₂ condition	Process piping Buffer tanks Pure H ₂ condition	Process piping Reactors H ₂ -processing	Process piping Reactors H ₂ -processing

Typical steel grades

H2fit basic

- » BM-X80M
- » P 235-690
- » (S)A 516 / 537 Cl. 1 / Cl. 2

H2fit classic

- » (S)A 516 Gr. 60 / 65 / 70 acc. to ASTM / ASME
- » (S)A 537 Cl. 1
- » P 235-460

H2fit severe Clad

- » P 235-690 + 304 / 316 / 317 ^{*)}
- » (S)A 516 / 537 Cl. 1 / Cl. 2 + 304 / 316 / 317 ^{*)}
- » (S)A 387 Gr. 11 / Gr. 22 + 304 / 316 / 317 ^{*)}

H2fit severe Clad + HIC

- » (S)A 516 Gr. 60 / Gr. 65 / Gr. 70 acc. to ASTM / ASME + 304 / 316 / 317 ^{*)}
- » (S)A 537 Cl. 1 + 304 / 316 / 317 ^{*)}
- » P 235-460 + 304 / 316 / 317 ^{*)}
- » (S)A 387 Gr. 11 + 304 / 316 / 317 ^{*)}

^{*)}Typical austenitic stainless steel grades; Ni-basis alloys on demand and to be discussed.

The above shown table shall be understood a first guideline and represents only a selection of typical materials for the use in hydrogen atmosphere. The actual definition of the appropriate steel grade in respect to individual project requirements shall be done after technical discussion.

OUR PATH TO A GREENER FUTURE

Premium products in the greentec steel Edition

With greentec steel, voestalpine is pursuing an ambitious step-by-step plan in the long-term decarbonization of steel production. The declared objective is to achieve carbon-neutral production by 2050, and the initial steps have already been taken. Process-optimized production operations already prevent up to 10% of the direct CO₂ emissions at the Linz site. The material and processing properties of the steel are not affected in any way in this production route. Each voestalpine heavy plate product is available in premium quality in the greentec steel Edition with a reduced carbon footprint and unique benefits.



Premium quality with reduced carbon footprint

Heavy plates (excl. heads and clad plates) – greentec steel Edition

Max. carbon footprint 2.21 kg CO₂e per kg of steel ¹⁾

¹⁾ per EN 15804+A2 (EPD methodology) cradle to gate

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