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Global Hydrogen-induced Cracking Resistant Steel Market 2026 by Manufacturers, Regions, Type and Application, Forecast to 2032

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Abstracts

According to our (Global Info Research) latest study, the global Hydrogen-induced Cracking Resistant Steel market size was valued at US$ 1010 million in 2025 and is forecast to a readjusted size of US$ 1518 million by 2032 with a CAGR of 6.0% during review period.

Hydrogen-induced Cracking Resistant Steel refers to a class of steels specifically developed for sour service environments, especially wet H2S-containing oil and gas, refining, gas treatment, pipeline, and pressure vessel applications, where resistance to hydrogen-induced cracking is required in addition to strength, toughness, and weldability. It is designed to solve the problem that conventional carbon steels and low-alloy steels may develop internal cracking, stepwise cracking, and related damage when atomic hydrogen generated by aqueous sulfide corrosion diffuses into the steel and accumulates at inclusions, segregated zones, or other microstructural traps. Historically, this product category emerged alongside the expansion of sour oil and gas production and the increasing severity of refinery and gas-processing service conditions, which led the industry to adopt dedicated qualification methods such as NACE/AMPP TM0284 and to develop cleaner steelmaking routes with lower sulfur and phosphorus, improved inclusion shape control, reduced segregation, and optimized rolling and heat treatment. In upstream terms, the category depends on iron ore, scrap, coke, ferroalloys, calcium treatment materials, and other steelmaking inputs, together with supporting processes such as continuous casting, rolling, heat treatment, welding consumables, inspection, and pressure vessel or linepipe fabrication. Industry product literature from SSAB, Industeel, voestalpine, and JFE consistently describes HIC-resistant steels as sour-service grades produced through special steelmaking practices aimed at improving resistance to hydrogen-induced cracking in wet hydrogen sulfide

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environments.In 2025, the global hydrogen-induced cracking resistant steel market had a production capacity of approximately 500,000 tons, sales volume of approximately 434,000 tons, an average price of about USD 2,260 per ton, and gross margins generally ranging from 17% to 28%.

The current market is primarily supported by oil and gas production, natural gas gathering and transmission, refining desulfurization, sour-media processing, and related pressure vessel and pipeline projects, which means demand is driven more by reliability upgrading under severe service conditions than by ordinary steel substitution. Public technical materials consistently show that hydrogen-induced cracking resistant steel remains closely tied to wet H2S sour service, because these environments promote hydrogen entry into steel and trigger HIC, SSC, and related damage mechanisms. As a result, buyers place greater emphasis on steel cleanliness, inclusion control, segregation reduction, weldability, and third-party qualification testing rather than on strength level alone. Product information from SSAB, JFE, and Nippon Steel all highlights sour service performance, wet H2S resistance, NACE/AMPP testing, and clean-steel production, indicating that this is fundamentally a highly engineered and specification-driven niche market.

Future development is likely to focus on suitability for more severe environments and on balancing a broader set of performance requirements. As some oil and gas projects move toward higher H2S partial pressures, higher pressure conditions, and more complex transport environments, market expectations are shifting from basic crack resistance toward a combination of strength, controlled hardness, weld and heat-affected-zone stability, through-thickness consistency, and long-term integrity. Nippon Steel’s 2025 technical report states that SSC has still occurred in sour-resistant line pipes used in high-pressure H2S environments, which is pushing the industry to develop next-generation steels by addressing hardness criteria, hydrogen absorption, microstructure, and manufacturing technology together. JFE’s published work similarly emphasizes that achieving both strength and HIC resistance requires deeper control over inclusions, segregation, and microstructure. This suggests that future competition will increasingly depend on integrated metallurgical design and project validation capability rather than on a single steel grade alone.

The main market drivers include continued development of high-sulfur oil and gas resources, replacement of aging sour-service pipelines and vessels, lower tolerance for failure risk among operators, and tighter testing and design requirements. The main restraints are the high technical threshold, long qualification cycle, strict end-user approval process, and the fact that failures in real service rarely involve HIC alone; they

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may also involve SSC, SOHIC, weld-related weaknesses, local hard zones, and fluctuations in the corrosive medium. AMPP's framework for H2S-related cracking itself reflects this multi-mechanism complexity, while steelmaker technical publications repeatedly show that HIC resistance cannot be achieved through simple alloy adjustment alone, but depends on full-process control from refining and casting to rolling and heat treatment. This gives the segment durable demand and meaningful technical barriers, but also limits the speed at which it can expand compared with standard pressure vessel steel or conventional linepipe steel markets.

This report is a detailed and comprehensive analysis for global Hydrogen-induced Cracking Resistant Steel market. Both quantitative and qualitative analyses are presented by manufacturers, by region & country, by Type and by Application. As the market is constantly changing, this report explores the competition, supply and demand trends, as well as key factors that contribute to its changing demands across many markets. Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

Key Features:

Global Hydrogen-induced Cracking Resistant Steel market size and forecasts, in consumption value ($ Million), sales quantity (Kilotons), and average selling prices (US$/Ton), 2021-2032

Global Hydrogen-induced Cracking Resistant Steel market size and forecasts by region and country, in consumption value ($ Million), sales quantity (Kilotons), and average selling prices (US$/Ton), 2021-2032

Global Hydrogen-induced Cracking Resistant Steel market size and forecasts, by Type and by Application, in consumption value ($ Million), sales quantity (Kilotons), and average selling prices (US$/Ton), 2021-2032

Global Hydrogen-induced Cracking Resistant Steel market shares of main players, shipments in revenue ($ Million), sales quantity (Kilotons), and ASP (US$/Ton), 2021-2026

The Primary Objectives in This Report Are:

To determine the size of the total market opportunity of global and key countries
To assess the growth potential for Hydrogen-induced Cracking Resistant Steel

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To forecast future growth in each product and end-use market
To assess competitive factors affecting the marketplace
This report profiles key players in the global Hydrogen-induced Cracking Resistant Steel market based on the following parameters - company overview, sales quantity, revenue, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Proterial, Nippon Steel, ArcelorMittal, POSCO, ThyssenKrupp, Voestalpine, Baosteel Group, Masteel, U.S. Steel, Tata Steel, etc.
This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Market Segmentation

Hydrogen-induced Cracking Resistant Steel market is split by Type and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for consumption value by Type, and by Application in terms of volume and value. This analysis can help you expand your business by targeting qualified niche markets.

Market segment by Type

Chromium Molybdenum Steels

Austenitic Stainless Steels

Other

Market segment by Product Form

Plate Steel

Heavy Plate Steel

Line Pipe Steel

Pressure Vessel Steel

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Market segment by Sour Service Severity

- Mild Sour Service Steel
- Standard Sour Service Steel
- Severe Sour Service Steel

Market segment by Application

- Oil and Gas
- Refining and Petrochemicals
- Hydrogen Storage and Transport
- Power and Nuclear
- Others

Major players covered

- Proterial
- Nippon Steel
- ArcelorMittal
- POSCO
- ThyssenKrupp
- Voestalpine
- Baosteel Group
- Masteel

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U.S. Steel

Tata Steel

JFE Steel

Ansteel Group

Dillinger Group

Market segment by region, regional analysis covers

North America (United States, Canada, and Mexico)
Europe (Germany, France, United Kingdom, Russia, Italy, and Rest of Europe)
Asia-Pacific (China, Japan, Korea, India, Southeast Asia, and Australia)
South America (Brazil, Argentina, Colombia, and Rest of South America)
Middle East & Africa (Saudi Arabia, UAE, Egypt, South Africa, and Rest of Middle East & Africa)

The content of the study subjects, includes a total of 15 chapters:

Chapter 1, to describe Hydrogen-induced Cracking Resistant Steel product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top manufacturers of Hydrogen-induced Cracking Resistant Steel, with price, sales quantity, revenue, and global market share of Hydrogen-induced Cracking Resistant Steel from 2021 to 2026.

Chapter 3, the Hydrogen-induced Cracking Resistant Steel competitive situation, sales quantity, revenue, and global market share of top manufacturers are analyzed emphatically by landscape contrast.

Chapter 4, the Hydrogen-induced Cracking Resistant Steel breakdown data are shown at the regional level, to show the sales quantity, consumption value, and growth by regions, from 2021 to 2032.

Chapter 5 and 6, to segment the sales by Type and by Application, with sales market

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share and growth rate by Type, by Application, from 2021 to 2032.

Chapter 7, 8, 9, 10 and 11, to break the sales data at the country level, with sales quantity, consumption value, and market share for key countries in the world, from 2021 to 2026.and Hydrogen-induced Cracking Resistant Steel market forecast, by regions, by Type, and by Application, with sales and revenue, from 2027 to 2032.

Chapter 12, market dynamics, drivers, restraints, trends, and Porters Five Forces analysis.

Chapter 13, the key raw materials and key suppliers, and industry chain of Hydrogen-induced Cracking Resistant Steel.

Chapter 14 and 15, to describe Hydrogen-induced Cracking Resistant Steel sales channel, distributors, customers, research findings and conclusion.

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