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Global Hydrogen-induced Cracking Resistant Steel Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Hydrogen-induced Cracking Resistant Steel market size is expected to reach $ 1518 million by 2032, rising at a market growth of 6.0% CAGR during the forecast period (2026-2032).

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 environments.In 2025, the global hydrogen-induced cracking resistant steel market had a production capacity of approximately 500,000 tons, sales volume of approximately

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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 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

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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 studies the global Hydrogen-induced Cracking Resistant Steel production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Hydrogen-induced Cracking Resistant Steel and provides market size (US$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Hydrogen-induced Cracking Resistant Steel that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Hydrogen-induced Cracking Resistant Steel total production and demand, 2021-2032, (Kilotons)

Global Hydrogen-induced Cracking Resistant Steel total production value, 2021-2032, (USD Million)

Global Hydrogen-induced Cracking Resistant Steel production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Kilotons), (based on production site)

Global Hydrogen-induced Cracking Resistant Steel consumption by region & country, CAGR, 2021-2032 & (Kilotons)

U.S. VS China: Hydrogen-induced Cracking Resistant Steel domestic production, consumption, key domestic manufacturers and share

Global Hydrogen-induced Cracking Resistant Steel production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Kilotons)

Global Hydrogen-induced Cracking Resistant Steel production by Type, production, value, CAGR, 2021-2032, (USD Million) & (Kilotons)

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Global Hydrogen-induced Cracking Resistant Steel production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Kilotons)

This report profiles key players in the global Hydrogen-induced Cracking Resistant Steel market based on the following parameters - company overview, production, value, 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.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Hydrogen-induced Cracking Resistant Steel market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (Kilotons) and average price (US$/Ton) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Hydrogen-induced Cracking Resistant Steel Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

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India

Rest of World

Global Hydrogen-induced Cracking Resistant Steel Market, Segmentation by Type:

Chromium Molybdenum Steels

Austenitic Stainless Steels

Other

Global Hydrogen-induced Cracking Resistant Steel Market, Segmentation by Product Form:

Plate Steel

Heavy Plate Steel

Line Pipe Steel

Pressure Vessel Steel

Global Hydrogen-induced Cracking Resistant Steel Market, Segmentation by Sour Service Severity:

Mild Sour Service Steel

Standard Sour Service Steel

Severe Sour Service Steel

Global Hydrogen-induced Cracking Resistant Steel Market, Segmentation by Application:

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Oil and Gas

Refining and Petrochemicals

Hydrogen Storage and Transport

Power and Nuclear

Others

Companies Profiled:

Proterial

Nippon Steel

ArcelorMittal

POSCO

ThyssenKrupp

Voestalpine

Baosteel Group

Masteel

U.S. Steel

Tata Steel

JFE Steel

Ansteel Group

Dillinger Group

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Key Questions Answered:

1. How big is the global Hydrogen-induced Cracking Resistant Steel market?
2. What is the demand of the global Hydrogen-induced Cracking Resistant Steel market?
3. What is the year over year growth of the global Hydrogen-induced Cracking Resistant Steel market?
4. What is the production and production value of the global Hydrogen-induced Cracking Resistant Steel market?
5. Who are the key producers in the global Hydrogen-induced Cracking Resistant Steel market?
6. What are the growth factors driving the market demand?

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