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Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market size is expected to reach $ 698 million by 2032, rising at a market growth of 8.3% CAGR during the forecast period (2026-2032).

Ultra?heavy steam turbine rotor forgings for generators above 1000MW refer to integral rotor blanks manufactured from vacuum?melted ingots of 600 metric tons or above, forged under a press of at least 10,000 metric tons, and intended for constructing 1000MW?class ultra?supercritical thermal turbine generators (full?speed units at 3000/3600 rpm). These forgings must operate continuously for decades under extreme conditions: temperatures up to 620?, pressures up to 35MPa, and centrifugal forces at 3000 rpm. They are typically made from advanced martensitic or modified ferritic heat?resistant steels (e.g., FB2, G115), requiring exceptional creep?rupture strength, low ductile?brittle transition temperature, excellent high?cycle fatigue resistance, and rigorous center soundness. This product category represents a pinnacle of global heavy?duty extreme manufacturing, as its domestic production capability directly determines a country’s ability to independently build ultra?supercritical coal plants and large nuclear stations, and serves as the ultimate yardstick for a nation‘s heavy forging industry.

Ultra-heavy rotor forgings for 1000MW and above thermal turbine generators represent the pinnacle of extreme manufacturing, characterized by high unit prices and extremely long lead times. In 2025-2026, imported FB2 HP?IP rotor forgings are priced at 3.0 to 4.0 million US dollars per unit, while domestic equivalents range from 2.0 to 2.5 million US dollars per unit; LP rotor forgings (70 to 110 tons) command 3.5 to 5.0 million US dollars each. Gross margins diverge sharply: Japan Steel Works, with its long?standing

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monopoly and mature process database, maintains margins of 35% to 45%; China‘s First Heavy Industries and Erzhong Equipment, still in import?substitution ramp?up, achieve 20% to 25% but with room for improvement as batch orders and process stabilization progress. Cost structures are dominated by ingot melting (including specialty alloys and vacuum treatment), accounting for 40% to 50% of total cost; heavy forging and heat treatment account for 25% to 30%; NDT and rough machining account for 15% to 20%. Downstream, new 1000MW+ ultra?supercritical coal units absorb about 85% of annual rotor forging consumption, life?extension and efficiency upgrades (HP?IP rotor replacement) account for 10%, and strategic reserves and exports for 5%. The core driver of incremental demand is the baseload power necessity for AI data centers: in 2026, 104 coal projects are scheduled for commissioning globally (85 in China alone); GE Vernova’s heavy?duty gas turbine order book is sold out through 2031 with a 20% price hike; Siemens Energy‘s backlog stands at 60 billion US dollars. These directly boost procurement of 1000MW class turbine generators, cascading to rotor forgings. Supply?side rigidities are stark: only five companies globally have proven capacity – Japan Steel Works, CFHI, Erzhong Equipment, France’s Creusot Forge, and Doosan Enerbility – but the latter two have significantly reduced influence. JSW plans to raise capacity to 1.5 times by fiscal year 2028, but this will take years to materialize, leaving a supply gap throughout. The competitive landscape features a “one superpower, two challengers” structure: JSW remains the high?end monopolist thanks to its decades?long process database; CFHI and Erzhong are rapidly catching up, having achieved full import substitution for FB2 series forgings. In the first quarter of 2026, Erzhong secured batch orders for both thermal and nuclear rotor forgings, while CFHI completed its first 620°C FB2 forging for Shanghai Electric, and G115 novel martensitic steel saw engineering application in the world‘s first 630°C double?reheat unit – signaling Chinese firms taking early lead in next?generation material grades. Key uncertainties include: first, the speed of yield learning curve for CFHI and Erzhong from prototype to stable mass production; second, whether AI data center build?out accelerates beyond current projections, widening the supply?demand imbalance; third, the pace of commercialization of materials for 630°C+ advanced ultra?supercritical units, which will determine the timeline for next?generation material transition. In summary, rotor forgings above 1000MW will face sustained supply shortages over the next five years, with pricing power shifting upward. The pace of import substitution will determine downstream turbine manufacturers‘ bargaining power and supply chain security, while the inherently time?consuming nature of extreme manufacturing process accumulation (not replicable by short?term capital investment) will keep strategic value persistently high.

This report studies the global Ultra?heavy Steam Turbine Rotor Forgings for Generators

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above 1000MW production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW 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 Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW that contribute to its increasing demand across many markets.

Highlights and key features of the study
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW total production and demand, 2021-2032, (Units)
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW total production value, 2021-2032, (USD Million)
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Units), (based on production site)
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW consumption by region & country, CAGR, 2021-2032 & (Units)
U.S. VS China: Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW domestic production, consumption, key domestic manufacturers and share
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Units)
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW production by Type, production, value, CAGR, 2021-2032, (USD Million) & (Units)
Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Units)

This report profiles key players in the global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW 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 Japan Steel Works, China First Heavy Industries, China Erzhong Equipment (DEC), France Creusot Forge (ex?Areva/Le Creusot), Doosan Enerbility, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

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Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (Units) and average price (US$/Unit) 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 Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW Market, Segmentation by Type:

Traditional Ferritic Steel (30Cr1Mo1V, max service temp 535-566°C, 10?h creep strength 80-120 MPa)

Advanced Ferritic Steel (FB2, 10%Cr, max service temp 600-620°C, 10?h creep

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strength 130-160 MPa)

Novel Martensitic Steel (G115, MarBN, max service temp 630-650°C, 10?h creep strength ?180 MPa)

Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW Market, Segmentation by Ultrasonic Testing Acceptance Levels:

Class 1 (single flat-bottom hole equivalent ?1.0mm, no clustered indications, no cracks)

Class 2 (equivalent flat-bottom hole ?2.0mm, isolated indications allowed, no cracks)

Class 3 (equivalent flat-bottom hole ?3.0mm, limited cluster allowed, no linear defects)

Global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW Market, Segmentation by Application:

New Ultra?supercritical Coal Power (1000MW+)

Existing Unit Life Extension & Efficiency Upgrade

Nuclear Half?speed Turbine Generators

Others

Companies Profiled:

Japan Steel Works

China First Heavy Industries

China Erzhong Equipment (DEC)

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France Creusot Forge (ex?Areva/Le Creusot)

Doosan Enerbility

Key Questions Answered:
1. How big is the global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market?
2. What is the demand of the global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market?
3. What is the year over year growth of the global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market?
4. What is the production and production value of the global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market?
5. Who are the key producers in the global Ultra?heavy Steam Turbine Rotor Forgings for Generators above 1000MW market?
6. What are the growth factors driving the market demand?

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