

U.S. Heat Treating Market Size, Share & Trends Analysis Report By Material (Steel, Cast Iron), By Process (Case hardening, Annealing), By Equipment, By Application, And Segment Forecasts, 2024 - 2030

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Abstracts

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U.S. Heat Treating Market Growth & Trends

The U.S. heat treating market size is anticipated to reach USD 27.32 billion by 2030 and is anticipated to register a CAGR of 2.8% from 2024 to 2030, according to a new report by Grand View Research, Inc. The market is expected to grow significantly in the coming years, driven by the rapid expansion of the EV industry and the increasing demand for metallurgical alterations to suit specific applications. Heat treatment plays a crucial role in enhancing the performance, efficiency, and longevity of critical components within EV drivetrains and battery systems, leading to a surge in demand for heat treatment in EVs.

Heat treating, an essential process in the manufacturing and metalworking sectors, has seen evolving demand trends shaped by various industry needs. For instance, the aerospace industry, constantly seeking enhanced durability and performance in critical components, has been a substantial driver for advanced heat-treating techniques like vacuum heat treating and plasma nitriding. Automotive trends, particularly the shift towards lightweight materials for improved fuel efficiency, have spurred demand for heat treatments that enhance aluminum's strength.

Heat treating involves controlled heating and cooling of materials to attain distinct mechanical properties such as strength, flexibility, and hardness. The temperature

control in the heating process is highly energy intensive. Achieving thermal efficiency and optimizing the load throughout requires the use of advanced technology. Heat-treating units use various furnace models to improve the thermal profile of the system. Numerical modeling systems are used to stimulate the heat-treating process.

Moreover, advancement in processing technology has helped to increase the efficiency of materials. The emergence of new technologies helped reduce friction and increase the strength of heat-treated materials. The key technological aspect of the heat treating industry involves obtaining energy efficiency. Vacuum carburizing and nitriding heating processes have gained rapid industrial acceptance across the globe. This has led to improvements in furnace designing technologies and atmosphere control processes.

Manufacturers in the U.S. heat treating industry are adopting several strategies, such as acquisitions, mergers, new product launches, and geographical expansion, to enhance market penetration and cater to changing technological demands. Key players in the market, including Bodycote, Bluewater Thermal Solutions, and Advanced Heat Treat Corp., focus on expanding their service offerings and investing in state-of-the-art facilities to enhance their capabilities and meet stringent industry standards. For instance, in January 2024, Bodycote completed the acquisition of Lake City HT, a provider of hot isostatic pressing (HIP) and heat treatment services. With this acquisition, the customer reach of Bodycote is expected to significantly increase in the medical market in the coming years.

U.S. Heat Treating Market Report Highlights

The steel material segment led the market with a revenue share of 79.7% in 2023. Growing demand for heat-treated steel parts in the construction industry, is expected to propel the demand for heat treating for steel over the forecast period. Steel is subjected to heat treating to obtain certain mechanical properties including strength, wear properties, and surface hardness.

The case hardening process segment is anticipated to show lucrative growth over the forecast period. The demand for case hardening processes within the market growth remains strong, driven by industries where

enhanced surface hardness and wear resistance of metal components are paramount. In applications such as automotive manufacturing, aerospace, and industrial machinery, case hardening plays a critical role in extending the lifespan and improving the performance of components subjected to heavy wear and friction. The automotive sector, for instance, relies on case hardening to enhance the durability of gears, camshafts, and other critical engine components.

The batch furnace equipment segment held the largest revenue share in 2023. Batch furnaces, also known as box furnaces, play a crucial role in various heat treatment applications owing to their adaptability and functionality. They feature an insulated compartment, which is designed to hold the materials being processed, thereby ensuring a tightly controlled heating environment. The primary aim of box furnaces is to offer a consistent and controllable heat treatment setting for a variety of processes.

The continuous furnace equipment segment is expected to show lucrative growth over the forecast period. Continuous furnaces are specialized industrial heat treatment equipment that are designed to manage an ongoing stream of workpieces. In contrast to batch furnaces, which process workpieces in limited quantities, continuous furnaces facilitate an uninterrupted heat treatment process. This makes continuous furnaces suitable for high-volume production and consistent heat treatment operations.

Batch furnaces are fuel-fired and electrically heated furnaces that cater to a broad array of industrial heating processes, each with distinct characteristics and suited to different applications. Batch furnaces are designed

Heat materials in discrete batches. This setup allows for precise control over the heating cycle and atmosphere, accommodating a wide variety of materials and processes. Since these furnaces operate on a batch-by-batch basis, they do not run continuously.

The automotive application is anticipated to show lucrative growth over the forecast period due to the growing EV industry and the increasing demand for greener technologies that can deliver energy-efficient heat treatment. Moreover, new and advanced equipment required for EVs is expected to propel industry growth. The demand for heat treating in the automotive industry remains robust, driven by the sector's relentless pursuit of lightweight materials, improved mechanical properties, and enhanced durability.

In April 2024, SECO/WARWICK, INC. inaugurated a new production facility in India, marking another milestone in its global expansion strategy to deliver high-quality metal heat treatment equipment across all continents. The new plant spans 4,000 m² with a ceiling height of 12 meters. It is equipped with two overhead cranes capable of lifting 15 tons each. Strategically located in a special economic zone near Pune, Maharashtra, India, the facility is close to numerous industrial plants and potential customers for the company. The plant is expected to focus on manufacturing vacuum equipment and CAB lines and providing comprehensive service support.

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