



## STUDY OF CONDENSERS IN THERMAL POWER PLANTS: TYPES AND ADVANTAGES

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### Abstract

This article examines the importance of condensers in thermal power plants, their different types and the advantages they offer. Condensers play a crucial role in the steam cycle, converting steam back into water, making it easier to reuse and increasing the overall efficiency of the power generation process. Understanding the different capacitor types and their benefits can help optimize power plant performance and stability.

**Keywords:** condensers, thermal power plants, steam circulation, heat transfer, efficiency, cooling technologies.

### Introduction:

Thermal power plants are important sources of electricity generation and rely on steam turbines to generate power. Central to the operation of these power plants are condensers that facilitate the conversion of high-pressure steam to water. Having studied the various types of condensers used in thermal power plants, this article aims to shed light on their advantages and role in improving plant efficiency.

**Condenser Types:** Surface Condensers: Surface condensers are most commonly used in thermal power plants. They consist of a large number of tubes through which coolant flows, which causes steam to condense on the tube surfaces. The condensed water is then collected and reused in the steam cycle. Surface condensers offer advantages such as reduced water consumption and improved heat transfer efficiency.



## **Jet condensers:**

Jet condensers use the principle of direct contact cooling. Vapor condenses through direct contact with the refrigerant, usually water. The mixture of condensed steam and coolant is then separated and the coolant is recycled. Jet condensers are known for their simplicity and ability to process large volumes of steam, making them suitable for specific applications in thermal power plants.

## **Condenser advantages:**

**Water conservation:** Condensers allow water to be reused in the steam cycle of a power plant. Thermal power plants minimize water consumption by recycling condensed water and contribute to sustainable resource management.

**Improved efficiency:** efficient condensation of steam allows to increase the efficiency of heat transfer in a power plant. By turning steam back into water, condensers facilitate the reuse of latent heat, reducing energy loss and increasing overall plant efficiency.

**Integration of cooling technologies:** Condensers provide an interface for integrating cooling technologies such as cooling towers or natural water ponds. By efficiently transferring heat from the power plant to the environment, condensers help maintain optimal operating temperatures and maintain environmental balance.

## **Summary:**

Condensers are important components of thermal power plants, allowing steam to be converted to water and reused in the steam cycle. Surface condensers and jet condensers are the main types used, each with distinct advantages. These include water conservation, energy efficiency and the integration of cooling technologies. By optimizing condenser design and performance, thermal power plants can improve their performance, reduce their environmental impact, and contribute to sustainable energy production.

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