

## Reduction on Energy Consumption by 32% through Replacement of Oversize Pump with Correct Size Pump

### **Background :**

Modern foundry industries are equipped with induction furnace for metal melting to prepare castings. For prevent the overheating of induction coils and frequency inverter control panel, cooling water circuit is employed where pump circulate water from cooling tower to required areas.

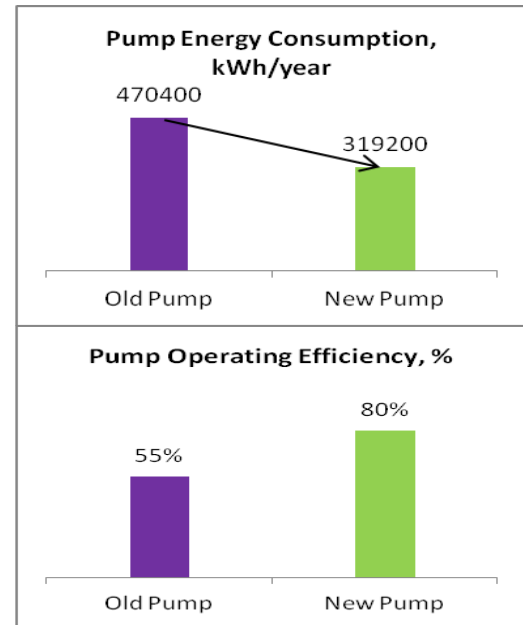
During the cooling water pump selection, to ensure circulation of sufficient cooling water, various safety factors were added for pump selection, which will generally result in installing an oversized pump, which will operate at an excessive flow rate or in a throttled condition, which increases energy usage and reduces pump life.

### **Baseline parameters & diagnosis:**

The study of the cooling tower (CT) pump circulating water from CT to Process revealed that pump with designed parameters (40 m head and 420 m<sup>3</sup>/hr flow) was operating at very low efficiency of 55% (22 m head, 505 m<sup>3</sup>/hr) with electrical power consumption of around 56 kW. The low operating efficiency was due to actual pump duty point was away from design duty point or in simplify way actual pump operating head was 22 m where as it was designed for 40m head.

To improve the pumping system efficiency, existing pump was replaced with correct size to meet process flow requirement of 500 m<sup>3</sup>/hr and 22 m head. **The new pump was operating with an efficiency of 80 % consuming around 38 kW of electrical power** Installation of new pump has given following benefits:

- Reduction in overall energy consumption by 32 %
- Full opening of throttling valve, reduction in wear & tear of pumping system
- Improved life of pumping system



Old Pump



New Pump

### Life cycle of technology / equipment:

Life of pump was around 10-14 years. Operation and maintenance of the pump as per prescribed guide line will increase the life beyond the suggest life.

### Equipment Delivery/Installation lead time

Process down time required for replacement of pump will be of 1 day.

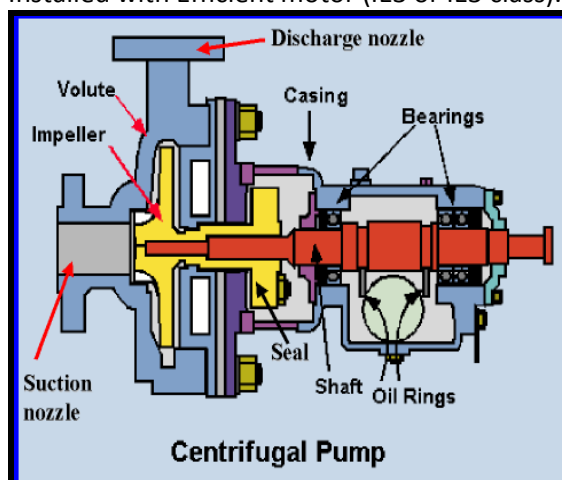
### Brief details of Energy Efficient Pumps:

Pump is mechanical equipment that converts kinetic energy into potential energy of fluid. Centrifugal type are the most commonly used pumps in all sectors of industries for lifting, circulating fluids like water, slurry etc. Centrifugal pumps are characterized by the relationship between the flow rate (Q) they produce and the pressure (H) at which the flow is delivered. Pump efficiency varies with flow and pressure, and it is highest at one particular flow rate

The Energy efficient pumps operate at higher efficiency compare to standard pump because of the following reason:

- New generation of alloys used as material of construction to reduce resistance to fluid flow
- Pump impeller and casing were designed and casted accurately to minimize friction to fluid flow

- Lesser gap between impeller and casing to minimize water recirculation
- Good quality bearings to minimize friction losses
- Installed with Efficient motor (IE3 or IE3 class).



### Overall Impact after Implementation:

- Reduction in power consumption
- Increased life of equipment.

### Skills Requirements:

No skills required for operation of pump, however tips were given to operator for proper operation and maintenance of pumps.

## About the Project

The World Bank (WB), with support from the Global Environmental Facility (GEF), is executing a project titled "FINANCING ENERGY EFFICIENCY AT MSMEs". The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO<sub>2</sub>. Majority of the MSME units completing implementation have reported significant energy and cost savings. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE)

### For Further Information please contact

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### Disclaimer:

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