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FINAL YEAR PROJECT REPORT

DIPLOMA IN MECHANICAL ENGINEERING

**HEATING AND COOLING IN FLUIDISED BED
FURNACE FOR HEAT TREATMENT AND
INDUSTRIAL APPLICATIONS**

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THE OBJECTIVES OF THE PROJECT.

- 1. To know the principle of fluidised bed furnace**
- 2. To find the industrial application of fluidised bed furnace**
- 3. To gain knowledge about the usage of fluidised bed furnace**
- 4. To explore the opportunities in current job, especially in heat treatment field**
- 5. To observe a variety of heat treatment processes in fluidised bed furnace**

1.0 FLUIDISED BED FURNACE

Fluidisation is a technique whereby gas or vapour is passed through so that the mixture behaves as a liquid and also has special significance when the solid is a catalyst to induce reactions in the fluidising medium. If a fluid is passed upward through a bed of solid with a velocity high enough for the particles to separate from one another by a small layer of fluid. The fluid may be either a liquid or gas. As the velocity of the fluid increases, the particles become suspended in the upward moving fluid. The point at which the particles just become suspended is the point at which the whole bed takes on the characteristics of a liquid. The particles become freely supported in the fluid, the bed is said to be fluidised. Then the total fluid frictional force on the particles is equal to the effective weight of the bed. It is usually used in the chemical industry because of:

- i. the intimate contact between solid and gas
- ii. the high rates of heat transfer
- iii. the uniform temperature within the bed
- iv. high heat transfer coefficients from the bed to the walls of the containing vessel

Fluidisation is also used in the transport of particles that otherwise are difficult to handle, e.g. unloading of powdered cement from transport trucks.

In the metal industry Fluidised Bed Furnaces are widely used for heat treatment, as heat treatment is the main process in the metal industry to change the metal properties.

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