

# Heat Treatment

## INDUSTRY

- Tempering
- Carburising
- Nitriding
- Vacuum treatments

## Optimisation of Heat Treatment Process Costs

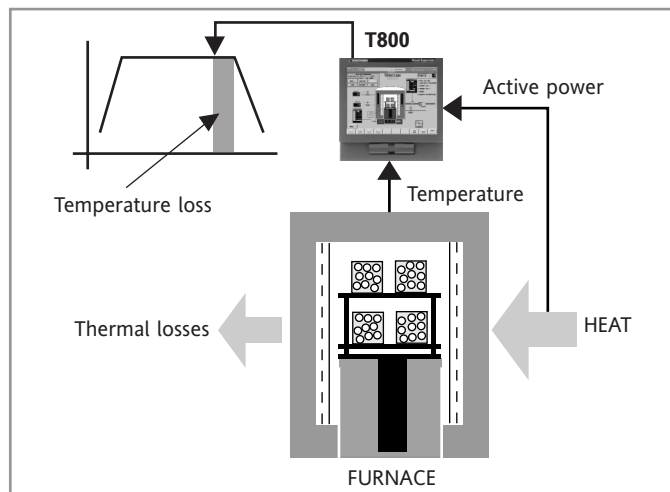
### Application Note

Traditionally when a load is heat treated in a furnace, the only measurements available to track the progress of the operation are the piece part temperature and the ambient temperature.

However, the requirement of the treatment is to heat the entire load up to a specific temperature whilst maintaining a homogeneous piece part temperature. In order to achieve this, the user needs to know the temperature at the centre of the load and the moment that all of the piece parts reach the required temperature - in order to ensure uniformity in the piece parts. Many recipes heat the load for longer than is necessary for required metallurgical operations. This adds cost to the user through unnecessary heating and also in reduced plant capacity.

There are currently 3 methods of ensuring a stable and homogeneous load temperature:

- ❑ **Manual intervention** - Open the oven door and visually inspect the load. This method is dependent on the skill of the operator, and disrupts the oven operation.
- ❑ **Standard automatic control** - When the heating process parameters are calculated, the dwell temperature is over-specified to ensure that the piece part temperature is uniform regardless of energy losses.
- ❑ **Eurotherm T800 control** - The Eurotherm T800 Process Supervisor is used to monitor the energy consumption as well as all of the usual parameters, ensuring that the required heating practice is achieved without wasted time and energy.



Eurotherm have created a modelling algorithm which calculates an oven parameter, allowing the temperature uniformity of a load to be defined. This then allows the cycle time, regardless of the load, to be optimised.

**This is the Eurotherm 'Steady State' method**

Which gives you:

**A greater availability of your assets**

**A reduction in your energy costs**

**A substantial financial gain**

The strength of this method is the independently validated algorithm, taking account of the rate of change of the energy consumption and of the temperature.

To do this, Eurotherm analyse the energy consumption of the oven as well as measuring the temperature.

Our algorithm determines the exact moment when the temperature becomes uniform for the entire load, regardless of the coefficient of emissivity, the mass and the physical location of the piece parts inside the oven.

### Multiple advantages

- ❑ Heat Treatment Furnaces

**Steady State** gives large savings of time and money. Based on existing installations, reductions of up to 20% of production time are possible, resulting in a substantial financial gain through improved asset utilisation.

- ❑ Vacuum Furnaces

**Steady State** is perfectly adapted to vacuum furnace applications, where thermocouple atmosphere temperature measurements are less representative than for standard ovens.

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## Eurotherm T800 Visual Supervisor

The Eurotherm Visual Supervisor is ideal for heat treatment applications because it combines all these key features into a single compact unit:

- **Complete temperature control** thanks to our Visual Supervisor T800 connected to the 2500 modules or the 2000/3000 Series controllers. The T800 includes all of the functionality of a signal generator, recipes, batch management, archiving etc.
- **Oven temperature limitation** thanks to our 2408i indicator or our 2500 modules connected to the T800 Visual Supervisor.
- **Energy consumption measurement** thanks to our EMA energy management module which gives a precise measure of voltage and current.
- **Precise heating control** thanks to our extensive range of power controllers.
- **Payback on your investments** thanks to our T800 Visual Supervisor which gives improvements in running time and energy consumption.
- **Optimal factory management** thanks to our control and supervision systems.



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