

HOW IT WORKS

An Energy Efficient Laboratory Oven

Problem: The global energy crisis is growing and is driving the costs of energy higher, making energy consciousness not only a necessity in terms of the environment, but also important for cost savings. Laboratories of any discipline are extremely energy intensive, with processes and experimental instruments running around the clock. The US Environmental Protection Agency's (EPA) 5 Star initiative estimates that the energy consumption in a laboratory setting is five to ten times that of a normal office building [1]. Essential safety equipment which runs continuously is a major contributor to overall energy use, with ventilated cabinets running 24 hours a day consuming three to four times as much energy as an average house [1].

The laboratory energy consumption most easily reduced by the individual is from plug-based instruments. This makes up 23 percent of total use in the laboratory and it is essential that individual users are made aware of the efficiency features of equipment before use or purchase [2].

Laboratory ovens, used for heating and drying processes, frequently run for lengthy, high temperature protocols and use large amounts of electricity. Some units run 24/7 to be prepared for rapid testing. Selection of an oven based on the energy footprint within the laboratory can provide significant cost savings over time.

Solution: The Thermo Scientific Heratherm ovens provide an efficient approach to laboratory heating and drying applications with savings in energy consumption of up to 39 percent compared to conventional instruments [3]. At energy costs of \$0.2 per kWh, this translates into savings of \$409 per year, when running the oven at 150 °C, 24 hours a day. Designed to incorporate a number of control options and energy efficiency features, these ovens provide an excellent solution to reduce the consumption of electricity.

Perhaps the simplest method of saving energy within heating and drying applications is to select an oven with effective use of the internal chamber space. It is crucial that the design of the shelving system provides space advantages, eliminating the need for a second oven unit.

Insulation is vital in any heating appliance, as energy transfer to the surrounding environment not only increases the energy consumption of the oven unit, but places additional strain on the temperature control systems for the laboratory space. The special insulation and heat decoupled doors of the Heratherm® range are engineered to minimize energy wastage through heat loss.

It is important that a laboratory heating and drying oven is capable of meeting specific application needs and the platform is flexible enough to provide a resource for a number of methods. The Heratherm General Protocol, Advanced Protocol and Advanced Protocol Security models form an

oven range with a focus on energy efficiency and sample protection. Advanced Protocol instruments incorporate controllable temperature cycles, fan speeds and damper positions to provide more energy efficient heating and cool down processes. The Advanced Protocol Security models incorporate an auto-dry function that shuts the oven down when the sample is dry, reducing energy wastage through unnecessary operation.



▲ Figure 1: Thermo Scientific Heratherm Ovens can save up to 39 percent on energy consumption

Several design features can help prevent the oven from being run longer than is needed, reducing energy consumption even further:

- The flexible timer function enables the operator to set the operating time, automatically switching the unit on/off at specified times during a day
- The boost function reduces the heat up time of the oven by up to 46 percent, thus avoiding 24/7 operation of the unit

Selection of an appropriate oven for heating and drying, based on energy efficiency features, can help to increase the productivity of the laboratory, while decreasing the cost of running the equipment. The current economic climate makes energy efficient laboratory instruments crucially important in maintaining affordable overhead costs.

For more information on the new Heratherm ovens, visit www.thermoscientific.com/hot.

References

[1] http://www.energystar.gov/index.cfm?c=industry.bus_labs_benchmark

[2] http://labs21.lbl.gov/wiki/equipment/index.php/Energy_Efficient_Laboratory_Equipment_Wiki

[3] Based on internal performance data (Comparing traditional Thermo Scientific to the new Heratherm ovens)