

LOW COST WATER HEATING SYSTEM FOCUSED ON THE FOOD INDUSTRY

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ABSTRACT

The present work has the objective to show the building of a solar water heating, and in the same time show how its work using solar thermal energy, that it will be used with thermal counters for food in restaurants, cafeterias and industrial kitchens, in order to reduce consumption of electric energy, and the cost of preheating the water. Considering that the equipment is present in most of the establishments mentioned above, where in Brazil, its operation is from electric power, which allows high costs of operation. In the most of time, a device with electric resistance used in restaurants causes heating in water at about 70°C to 100°C.

With this, it was adopted as a basis the already known solar heating system, where through the studies of ways to reduce the costs in manufacturing, as well as the test of new materials, low cost and easy to acquire, in addition to studies and improvements in thermal insulation, in order to reduce thermal losses in the course of the process, As well as reaching higher temperatures.

The operation of a solar heater consists of a reservoir with thermal insulation interconnected by means of pipes to a collecting plate. The function of this is to exchange heat with the fluid, in this case, water, through exposure to the sun's rays. So the collector plates are the essential parts for the best operation and performance of the heater, so the choice of the appropriate material is of extreme importance as well as the geometry and shape of the part.

Another very important measure is the insulation of the collector plates by wood boxes with glass so that the circulation of air around the heat exchanger surface does not cause the inverse effect of the desired heat withdrawal from the fluid.

In the development of this work, two automotive radiators were used as a solar radiation collection system, due to its longer life, higher thermal conductivity compared to polymer and the great ease of acquisition in scrap. To reach higher temperatures the radiators were painted in black. The interconnection of the system was made from electric shower hose.

For performance improvement we built two wood boxes, one for each radiator also painted in black color. With the objective of isolating the system from the external air circulation, after analysis it was noticed that when there was air circulation, the heating performance was reduced drastically, in addition, it was possible to reach temperatures in the order of 49 ° C. The operation consists of a box made with plywood and painted in black with a glass cover.

Also, it is important to note the origin of the materials being all these reused contributing to the best use of materials and consequently the environment.

