

DESIGN OF A TOOL FOR THE ESTIMATION OF THERMAL LOAD AND ENERGY DEMAND IN REFRIGERATION CHAMBERS

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ABSTRACT

Refrigeration is key to preserve food, reduce losses and improve the competitiveness of the productive sectors, especially small and medium enterprises (SMEs). This need is even more evident in countries such as Bolivia, where the lack of adequate refrigeration and storage systems limits the use of harvest peaks, generating seasonal overproduction and significant economic losses due to the inability to preserve products. In this context, the present work proposes the development of an automated and user-friendly tool that allows the preliminary estimation of the thermal load and energy demand of cold stores from basic data such as dimensions, type of product and local climatic conditions. The tool considers all relevant thermal inputs (sensible and latent heat, transmission losses, infiltration and internal loads), and estimates the cooling capacity and energy consumption as a function of operating time. Additionally, its validation was carried out through a case study where it showed a minimum deviation from a real quotation, demonstrating its reliability as a support in the pre-design of refrigeration systems for productive sectors with more limited resources and technical knowledge.

Keywords: Energy Consumption, Cold Rooms, Thermal Load, Automation, Heat

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