

Energy labelling of Cold Stores

An energy label is introduced for (industrial) cold stores. The reason for this development was the application of the BREEAM methodology to a new distribution cold store belonging to a well-known supermarket chain. Energy labelling of cold stores has only recently come into the realm of possibilities when a European database of cold store energy consumption became available under the European ICE-E project.

Breeam

Breeam provides an assessment method for buildings. In this method, buildings are rated on a number of aspects, including energy and water use, health and well-being, pollution, transport, materials, waste, ecology and management processes.

In the Dutch version (Breeam-NL) “cold storage” is included as one of the items to be assessed under the energy aspect. In food retail (commercial) situations, a straightforward assessment based on the energy label of refrigerated display cabinets is used. But for industrial cold stores there are numerous conditions to fulfil, some of which are seriously limiting the freedom of design. An energy label for industrial cold stores is more in balance with the commercial situation, and redeems the freedom of choice for cold store designers.

Energy labelling Methodology

The two key items in the older energy labelling schemes were the availability of an international standard for the measurement of product energy consumption, and the availability of sufficient data on energy consumption of products in the current EU market (allowing the determination of market average energy consumption and spread). In more recent schemes, the energy consumption can not only be established by measurement, but also by calculation (e.g. for buildings). In that case, there needs to be a well-defined calculation method.

Comparing the energy consumption of an actual product with the market average energy consumption gives the Energy Efficiency Index I (in %) for that product. A classification table, such as shown in figure 1, then provides a mapping of the Energy efficiency index to the energy Labelling class for the product.

Energy Efficiency Index (I)	Energy Label
$I < 55$	A
$55 \leq I < 75$	B
$75 \leq I < 90$	C
$90 \leq I < 100$	D
$100 \leq I < 110$	E
$110 \leq I < 125$	F
$I \geq 125$	G

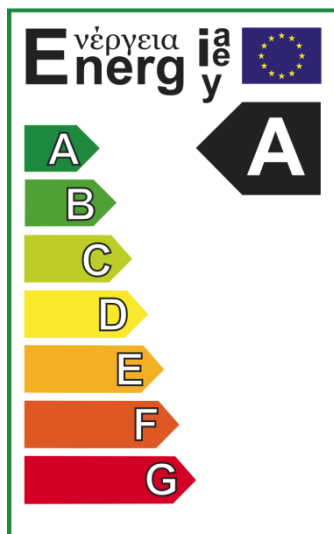
Figure 1: classification table

EU project ICE-E

The European ICE-E project (IEE/09/849/SI2.558301, 2010-2012) has provided a database with energy consumption data for 240 EU coldstores. Data for an individual cold store can be compared to the market average by means of the “Cold Store Energy Advisor” ⁽¹⁾. The comparison can be narrowed down, in order to compare only with Cold Stores with the same size and functionality.

Energy label for Cold Stores

The energy consumption of the cold store to be labelled is determined on the basis of calculation. For calculating the required heat extraction rate use is made of the general methodology given in the IIR Cold store guide ⁽²⁾. This is done in a number of (outdoor) temperature intervals, and for each interval the associated energy use is calculated (and finally summed). The Cold Store yearly energy use is then compared to the relevant subset of cold stores in the ICE-E database, to arrive at an Energy Efficiency Index I (in %) for the Cold Store to be labelled. The classification as presented in figure 1 is then applied, to arrive at the Energy Label for the Cold Store.



In January of 2012, this methodology has been applied by Saint Trofee to evaluate the energy label for a Cold Store under construction in The Netherlands (resulting in an “A” label for the Cold Store).

This documented result has been presented to Breeam-NL and was accepted as “alternative evidence” to apply an energy credit for the Cold Store in the Breeam-NL framework.

S.M. van der Sluis, M.Sc.
Saint Trofee
April 2012

¹ Cold Store Energy Advisor: <http://coldstoresurvey.teknologisk.dk>

² Cold Store Guide, IIR, Paris, 3rd edition 1993.