

EndoCube



What is an EndoCube?

A Product Invented and manufactured in the UK by British Engineers to:

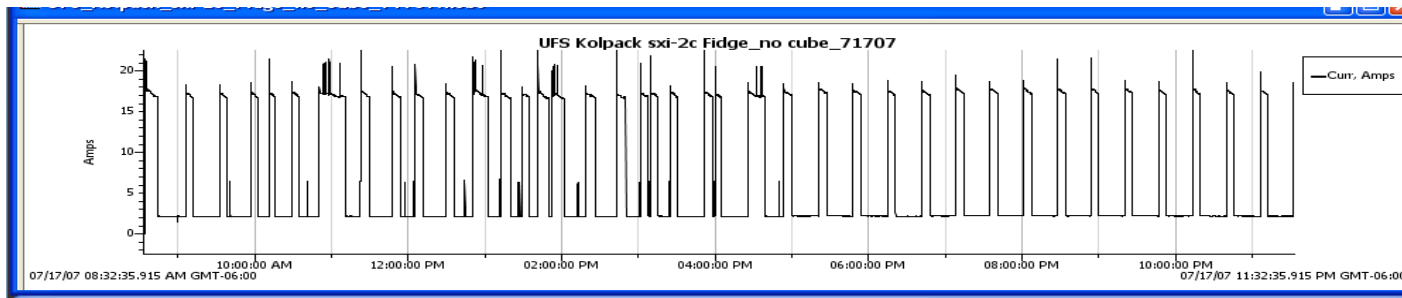
- Save energy by as much as 30%
- Increase the life of equipment
- Increase the safety of food storage
- Save CO₂ emissions and reduce carbon footprint

How does an EndoCube Work ?

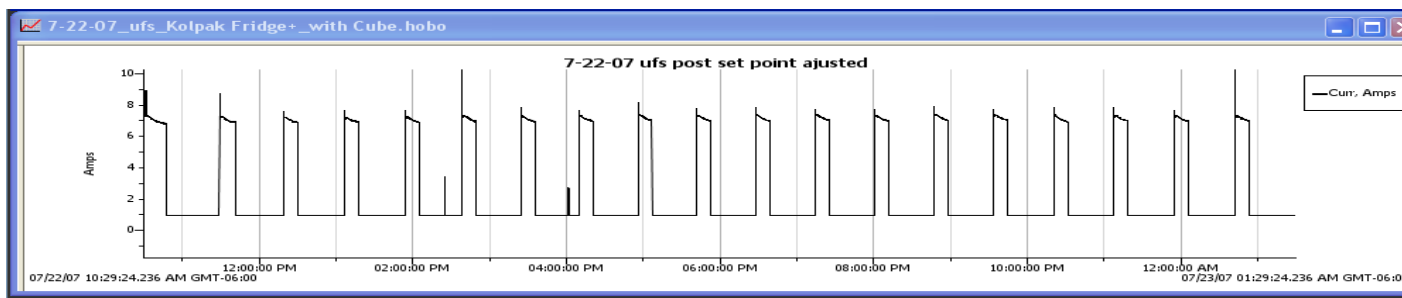
- It fits over the thermostat sensor on commercial refrigeration units.
- Microcrystalline wax within the EndoCube mimics food and encases the thermostat sensor preventing fluctuating air temperatures from controlling the refrigeration unit.
- The EndoCube turns the refrigeration unit on and off as the product temperature demands it.
- Because air no longer causes so many random stop starts, longer on/off cycles lead to considerable energy savings.

How it Works

Prior to an EndoCube being fitted, a refrigeration unit is controlled by fluctuating air temperatures which cause regular and random on/off cycles.



After fitting an EndoCube, the on/off cycles become longer and more even which reduces starts by around 75%.



Key Benefits

Energy Savings

- Trial results show that fitting an EndoCube typically reduces a refrigeration units energy consumption by 15-20% but in some cases it can exceed 30%.
- This benefit comes from the longer on/off cycles ie less starts and stops.
- This will reduce energy bills significantly.

Key Benefits

The Environment

- As previously mentioned, fitting an EndoCube will reduce energy consumption from a refrigeration unit by 15-20% on average.
- This will lead to a similar saving in CO₂ emissions which in the current environmental climate is significant.

Key Benefits

Extended Equipment Life

- The less starts and stops caused by the EndoCube will extend the lifespan of a refrigeration unit, especially the thermostat and compressor.
- This will lead to fewer plant failures, less engineering call out charges and reduce expenditure on replacement parts.

EndoCube[™] TRIAL DATA

No	Unit	01/11/11 No EndoCube		08/11/11 EndoCube Fitted		15/11/11 EndoCube Fitted		22/11/2011 EndoCube Fitted		Weekly KWH Saved	Average Temp	Weekly KWH Saved	% Saved	Weekly kg Carbon Saved	Annual kg Carbon Saved		
		Weekly KWH Used	Average Temp	Weekly KWH Used	Average Temp	Weekly KWH Used	Average Temp	Weekly KWH Used	Average Temp								
11	Walk in Cold Room: Main Kitchen	356.66	5.0	320.00	5	36.66	10.28%	318.81	5	37.85	10.61%	278.40	4.0	78.26	21.94%	42.46	2,208.12
2	Walk in Freezer Room: Main Kitchen	680.84	-17.5	629.43	-17.5	51.41	7.55%	599.40	-17.5	81.44	11.96%	585.00	-17.5	95.84	14.08%	51.91	2,699.16
3	Stores Freezer: Foster Double Door	166.20	-19.0	144.10	-19	22.1	13.30%	147.80	-19.5	18.40	11.07%	131.10	-19.0	35.10	21.12%	19.01	988.53
4	Main Kitchen Foster Gastro Single Door Upright Fridge	49.30	5.0	45.40	5.5	3.90	7.91%	41.60	5.0	7.70	15.62%	38.50	4.5	10.80	21.91%	5.85	561.60
5	Meat/Fish: Foster 3 Door Fridge	47.90	6.5	43.90	7	4.000	8.35%	41.40	6.5	6.50	13.57%	38.50	4.0	9.40	19.62%	5.09	264.73
1	Deli Café: Single Door Freezer	58.00	-23.5	49.10	-22.5	8.900	15.34%	48.20	-22.5	9.80	16.90%	47.60	-22.5	10.40	17.93%	5.63	292.90
50	Multi Deck Display Fridge	79.10	5.5	72.10	5.5	7.000	8.85%	68.40	6	10.70	13.53%	65.00	6.0	14.10	17.83%	7.64	397.10

NB: 5. Meat/Fish Fridge - fault during test period; not achieving desired temperature for products stored
1. Deli Café Freezer - fault during test period; operating colder than required

Totals

137.59 7,412.14

Extract from Bristol University Report

Results

- Fitting the EndoCube to the cabinet had minimal effects on temperatures of test packs. In the tests the temperature of test packs rose by up to 0.3°C when the EndoCube was fitted but the cabinet still operated within the M1 specification.
- The major influence of fitting the EndoCube was in reducing the energy consumed by the cabinet by 13% in both the door closed and door opening tests. Assuming usage similar to the door openings test regime the EndoCube would save 180 kWh/year.
- The number of compressor starts per hour was also reduced from 8.9/h with the door closed and 8.5/h with the door opened without the EndoCube to 3.1/h with the EndoCube fitted.

ENDOCUBE TEST DRAFT 19/03/08 (Electricity price at time of test)

REFRIGERATED UNIT	2.0m Multideck open display cabinet
DEFROSTS	6 per day 20mins
PRODUCT	No Product
AMBIENT	18-19°C
TEMPERATURE DIFFERENTIAL	2°C
TEMPERATURE SET POINTS WITH ENDOCUBE	3°C
NO ENDOCUBE	2°C
ELECTRICITY COST	0.11 p/kwh

Without EndoCube

Date	Time	Kw Reading	Kwh	Daily Cost
13/03/2008	1500	468		
14/03/2008	1500	489	21	2.31

With EndoCube

Date	Time	Kw Reading	Kwh	Daily Cost
11/03/2008	1430	437.4		
12/03/2008	1430	452.4	15	1.65
13/03/2008	1430	467.6	15.2	1.672

Saving: 2.31 – 1.65 = 66p per Day = ROI in 135 days

The Investment

EndoCube - Two year product warranty

Average **Return On Investment**: typically 9 – 12 months*

*As proven with testing ROI can be less than 6 months