

Energy saving with Bronz-Glow

This trial was conducted for and on behalf of Sainsburys supermarkets.

Author: Nick Rivers

Date: 10/02/2013

Location: Chesterfield

Sainsbury's
live well for less



Energy saving with Bronz-Glow



INTRODUCTION

Bronz-Glow is a specialist coating that provides corrosion protection to aid cooled condensers/gas coolers, this in turn provides energy reduction for the refrigeration system due to better heat transfer and consequential reduction in operating discharge pressure.

The coating is applied in simple steps:

- **Thorough clean of the condenser**
- **Allow surfaces to completely dry**
- **Spray Bronz-Glow coating onto condenser coil, ensuring complete penetration through the coil block**

System can be coated whilst in service by sectioning off fan modules and working down the length of the condenser.

TRIAL

Trial was carried out at Sainsbury's Store in Chesterfield, the refrigeration is supplied by two identical CO2 refrigeration systems with near identical loads.

Bronz-Glow was applied to one gas cooler (IT/LT2) and energy performance measured and compared against the other pack that remained un-treated.

Energy ICT was used to review energy consumption and figures obtained from there are included in this report.

Energy saving with Bronz-Glow

GAS COOLER BEFORE COATING



GAS COOLER AFTER COATING

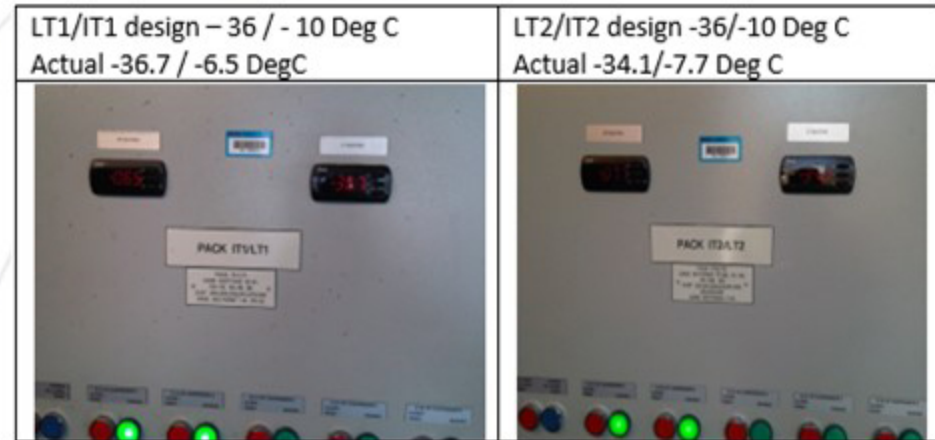


Energy saving with Bronz-Glow

LOAD ANALYSIS

A refrigeration load analysis has been undertaken to ensure that both packs are working at equal load and a site inspection was undertaken to correlate the information given to us by Carter Synergy and compare this to the information upon site. Small discrepancies between installed and designed data were analysed and taken into consideration and adjustments made. It is normal for commissioning adjustments to be made on site during operation to achieve best operating conditions. As can be seen below.

SCHEDULE OF CASES AND COLDROOMS							REF: 8			
Sainsbury's Chesterfield							DATE: 12/11/18			
System	Length / case / coldroom	Case / cooler model	Display Temp °C	Extraction Rate - air	Evap Temp °C	Defrost type	Total required load			
1	2m	Carter Islands	-21	1.13	-33	Elec	25.53 kW			
2	5m	Carter Islands	-21	2.83	-33	Elec	Condensing temperature 4 °C			
3	4m	Carter Islands	-21	2.27	-33	Elec	Saturated suction temperature -36 °C			
4	5m	Carter Islands	-21	2.83	-33	Elec	Suction return temperature -18 °C			
5	5m	Carter Islands	-21	2.83	-33	Elec	superheat 5 °C			
6	5m	Carter Islands	-21	2.83	-33	Elec	Liquid subcooling 3 °C			
20	3.75	Carter Verdes	-21	2.27	-34	Elec	COMPRESSOR SELECTION			
21	3.75	Carter Verdes	-21	2.27	-34	Elec	No.	Model	Duty	PI
22	3.75	Carter Verdes	-21	2.27	-34	Elec	1	ADVANTOR	34.00	
200	Freezer Food	Seale K2CCK5	-21	4.00	-34	Elec	2			
							3			
							4			
							5			
							6			
							7			
							8			
							9			
							10			
							11			
							12			
							13			
							14			
							15			
							16			
							17			
							18			
							19			
							20			
							21			
							22			
							23			
							24			
							25			
							26			
							27			
							28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			
							40			
							41			
							42			
							43			
							44			
							45			
							46			
							47			
							48			
							49			
							50			
							51			
							52			
							53			
							54			
							55			
							56			
							57			
							58			
							59			
							60			
							61			
							62			
							63			
							64			



The system 1 was loaded higher on the IT side but lower on the LT side, and system 2 was loaded lower on the IT side and higher on the LT side. This would be a sensible option in the operation of the plant and the discrepancies can be seen below. To provide an hourly duty to the system equal to the difference of LT1 Vs LT2, one LT compressor on LT2 would have to operate 48 min / hour extra.

Energy saving with Bronz-Glow

RESULTS



Following on from treatment, the system was left operational with no changes to the system set points, the only change being the treatment of the gas cooler with Bronz-Glow.

Below is a snapshot of the energy usage for both packs showing IT/LT2 with a lower energy usage. Unfortunately, Energy ICT does not have any data prior to this trial to identify the step change, but a clear difference can be seen from the graphs and tabular data below:



It is clearly identifiable that the energy consumption is better for pack 2 than pack 1, and on average this is a saving of approx. 8% for the period mid March to the end of May.

Also, it can be noted that there is a general trend that the difference increases as energy use rises, which indicates that the higher the ambient temperature, the greater the potential saving.

Based on the figures, the projected saving is 4260 kWh over 78 days, which equates to savings of 54.6 kWh per day, which is 19,935 kWh per year.

If electricity is £0.18 per kWh, then the saving will be in the order of £3,500.00 per year. This payback is less than a year.