NAKAHOMA, INC.

ENERGY REDUCTION SPECIALISTS

COMPRESS SHIELD

Compress Shield™ Treatments

Superdome Low Temp Equipment

New Orleans, Louisiana - December 2003

Results and Report
01/22/04

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Compress Shield™ Treatments
Low Temp Equipment – Central Ice Plant
Walk-in-Cooler and Walk-in-Freezer

December, 2003

The equipment treated consisted of three (3) ice machines, a walk-in-cooler and a walk-in-freezer located in the Superdome in New Orleans, Louisiana. On November 26th, 2003 HOBO data logging devices were installed on all of the equipment to be treated. HOBO data loggers are manufactured by Onset Computer company located in Bourne, Massachusetts.

The HOBO data loggers were installed several days prior to the Compress Shield™ treatments to establish base lines; to monitor the compressor run time on all of the units to be treated with two of the (2) HOBO data loggers installed in the cooler and freezer to monitor the temperature inside of those units.

All of the low temp equipment was treated with Compress Shield™ on December 3rd, 2003 by Jose Torres, the Superdome low temp technician and Nakahoma technical personnel. All data that was accumulated by the data loggers from November 26th, until December 3rd was downloaded and the HOBO data loggers were reset to begin collecting data from the time of the treatments until their removal approximately twenty (20) days later.

The ambient temperature inside the Superdome is fairly consistent. It is approximately 70°F most of the time during the November, December time frame.

Following is a report and analysis on the treated equipment.

Equipment Treated and Type of Compressor:

Unit #1 – Follet Ice Machine - 2 Ton Bristol Scroll Compressor. Freon HP-81 blend.

Unit #2 – Hoshizaki Ice Machine - 2 Ton Copeland Compressor. Freon R-22.

Unit #3 – Kloppenberg Ice Machine - 2 Ton Copeland Compressor. Freon R-22.

Unit #4 – Walk-in-Cooler - 1 Ton Copeland Compressor. Freon R-22.

Unit #5 – Walk-in-Freezer - 5 Ton Copeland Compressor. Freon R-502.

Treatment Procedures:

Before treating any of the units with Compress Shield™ we:

- recorded Make, Model and Serial Numbers of all units to be treated.
- amp draw readings were taken with a digital amp meter on each unit to ensure they were within the manufacturer's stated ranges.
- high pressure and low pressure readings were taken with a manifold and gauge set to ensure the units were operating within the manufacturer's specifications and to determine if they had sufficient freon in them.

- inspected condensing units for visible signs of freon/oil leaks or other abnormal conditions.
- recorded suction and liquid line temperatures at or near the service valves.
- recorded type of freon in each unit.

We then treated the compressors with the proper amount of Compress Shield™. Following are the before and after results:

Discharge/Suction Pressure Readings

		20 Days Overall 30 Minutes Before Treatment	After Treatment	After Treatment	(Reduction)/Increase
Unit #1	**Follet**	230/40	190/42	175/36	**(24%)/(10%)**
Unit #2	**Hoshizaki**	152/30	150/32	100/22	**(34%)/(27%)**
Unit #3	**Kloppenberg**	126/43	135/34	105/20	**(17%)/(53%)**
Unit #4	**Walk-in-Cooler**	110/30	105/32	150/20	**(9%)/(3.3%)**
Unit #5	**Walk-in-Freezer**	160/18	155/16	150/20	**(6.3%)/11%**

Jose Torres, the Superdome technical person, took all of the readings before, immediately after and twenty (20) days after the treatments.

Unit #1 Follet Ice Machine – Freon HP-81 Blend
The reduction in discharge/head pressure associated with **Unit #1** was significant. Jose Torres commented before the Compress Shield™ treatment that he was concerned about this particular unit due to the 230 PSI discharge pressure. To him, it seemed high under normal operating conditions. The HP-81 freon blend used in this ice machine is noted by the manufacturers of it to increase head pressure when used in low temp equipment. As indicated above, even though it is noted to cause high discharge pressure, the Compress Shield™, within minutes after the treatment, lowered the discharge pressure over 17%. After twenty (20) days the pressure dropped another 8% for a total reduction of 24%. The drop in discharge pressure means the ice machine is not working as hard to produce the ice which, should significantly prolong the life of the ice machine. Furthermore, a reduction in the discharge pressure indicates that the Compress Shield™ increased the heat transfer capability of the condensor by 24%, which is why the pressure dropped.

On the same unit, the suction pressure dropped from 42 PSI to 40 PSI within minutes. Twenty (20) days post treatment the suction pressure was 36 PSI for an overall drop in suction pressure of 10%. This drop indicates the thermal efficiency in the evaporator increased with a drop in the evaporator core temperature from 37ºF to 32ºF, or 4ºF, a 13.5% increase in thermal efficiency. This is a significant drop in the evaporator core temperature. The results of the temperature drop in the evaporator should be in a noticeable increase in ice production. The lower temperature will make ice faster and it should also be a “harder” ice than prior to the Compress Shield™ treatment.

The bottom line on this ice machine, **Unit #1**:

The Compress Shield™ lowered the head pressure/discharge pressure by 24%

- o Better heat transfer in the condensor
- o Extended equipment life
- o Fewer repairs will be required
- o Less energy consumption due to satisfying the demand for ice

Compress Shield™ lowered the evaporator core temperature from 37°F to 34°F

- o Evaporator core temp reduced by 4°F and should result in increased ice production
- o Evaporator core temp decrease is a 13.5% increase in thermal efficiency
- o Less compressor run time due to the increased thermal efficiency
- o Extended compressor life due to reduced run time and properly cycling on/off

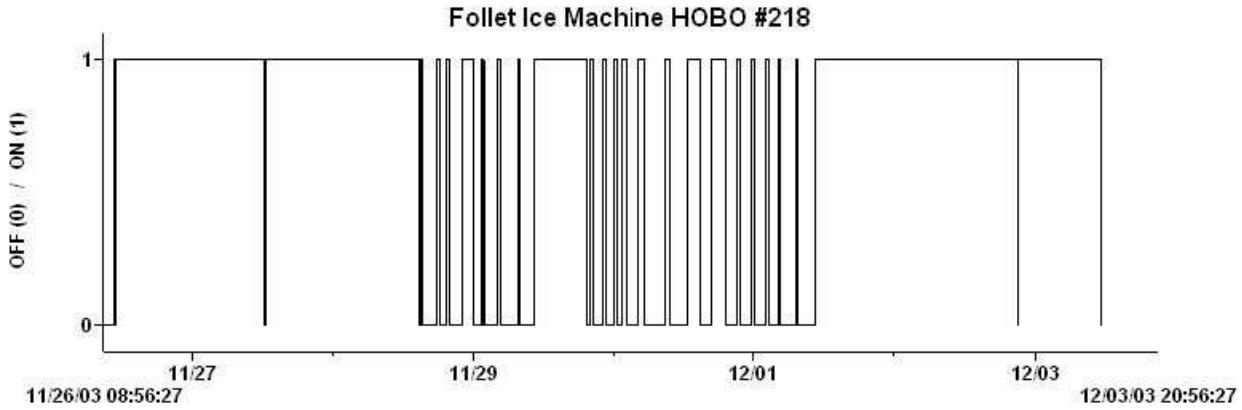
Suction pressure was reduced by 10%

- o Benefit is in the decrease in the evaporator core temperature above of 13.5%
- o Plus, all of the additional benefits of Compress Shield™ as described above

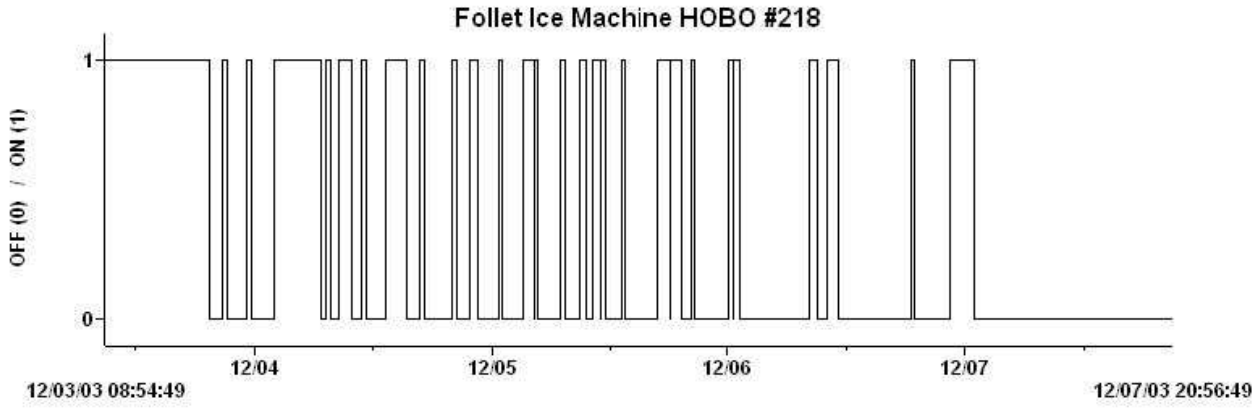
Overall increase in efficiency is 18.75%, taking the reduced discharge pressure of 24% and the 13.5% decrease in the evaporator core temperature.

HOBO Data Logger Graphs of Unit #1

Before Compress Shield® Treatment



After Compress Shield® Treatment



The reduced run time shown above will equate to reduced energy consumption of approximately 15% for this ice machine.

Unit #2 Hoshizaki Ice Machine – Freon R-22

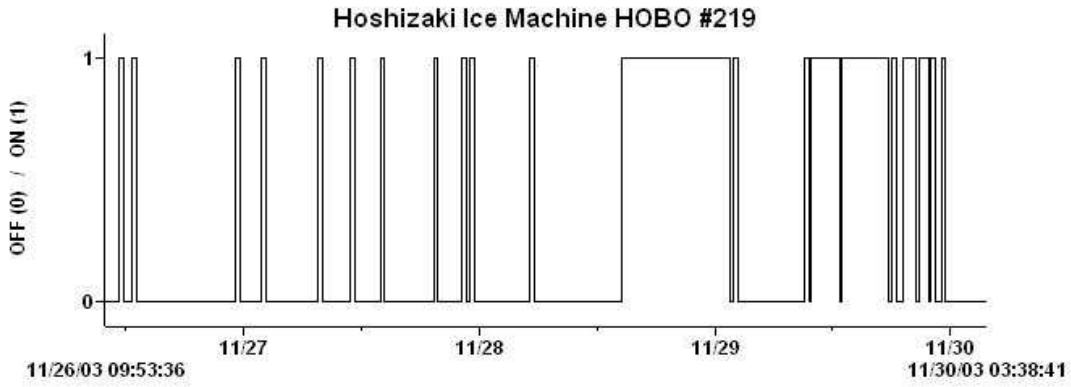
This ice machine showed the most significant results of the three (3) ice machines treated with Compress Shield™. The discharge pressure was reduced by more than 34% and the suction pressure was reduced by 27%. These reductions are what Compress Shield™ is all about. Increasing the heat transfer (discharge pressure) capability and increasing the thermal efficiency (suction pressure) capacity of refrigeration and HVAC equipment.

The evaporator core temperature was reduced from 7°F to -3°F a 10°F drop! This ice machine should be generating a lot more ice than before the treatment. Overall, the increase in heat transfer and thermal efficiency is over 30%.

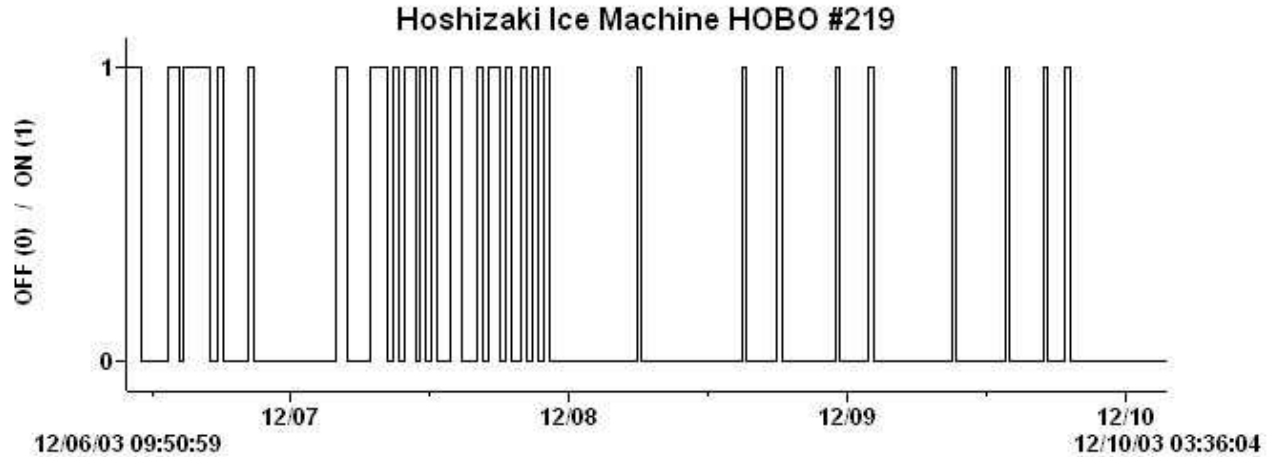
The HOBO data logger graphs for this ice machine does not indicate the ice machine had any problems before the treatment. It had a few longer than normal compressor run times before the Compress Shield™ treatment and after the Compress Shield™ treatment it appears to have stopped any long run times. However, it should be noted that the longer run times could be associated with unusual demand for ice such as a Bowl game, etc. I do not believe there were any significant events that took place during the time periods shown on the HOBO data logger graphs.

HOBO Data Logger Graphs of Unit #2

Before Compress Shield® Treatment



After Compress Shield® Treatment



Both of the graphs on the previous page are for four (4) day periods before and after the Compress Shield™ treatment.

A more in-depth analysis would be required to ascertain any additional, meaningful data from the graphs above other than the fact the evaporator core temperature dropped significantly (10°F), meaning the ice machine should be producing a lot more ice in shorter intervals and the fact the significant decrease in discharge pressure has greatly improved the heat transfer capability of the condensor, a 34%+ increase.

As mentioned in the previous Unit #1 analysis above, this machine will benefit from the Compress Shield™ treatments by increased ice making, longer equipment life, reduced maintenance and reduced energy consumption due to the increase in efficiencies.

Unit #3 Kloppenberg Ice Machine – Freon R-22

This ice machine's discharge pressure dropped from 126 PSI to 105 PSI post treatment. This is a 17% reduction in head pressure. The suction pressure dropped from 43 PSI to 20 PSI, a 53% reduction in pressure which equates to a 24°F reduction in the evaporator core temperature. This machine may need some freon added because it is unusual to see that large percentage pressure drop after a Compress Shield™ treatment. Or it could be that the pressure readings were taken when a harvest cycle was beginning or had just ended, leading to possible errors in the pressure readings. However, it is not unusual to see a drop in the evaporator core temperature between 15°F to 20°F post Compress Shield™ treatment.

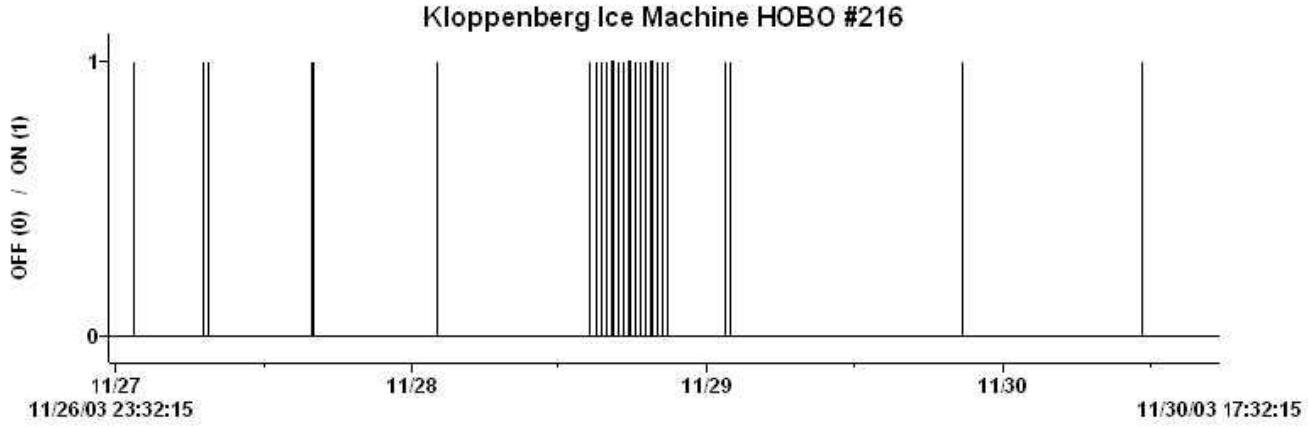
This still represents over 30% in increased efficiency for this ice machine, which is well within the boundaries of Compress Shield™.

The HOBO data logger graphs below indicate the possibility of this ice machine short cycling or possibly making very little ice before the Compress Shield™ treatment. Post treatment, there is clear pattern of run time that is consistent without the "spikes" that existed before the treatment. To ensure the data is an apples to apples comparison, and as in the other previous HOBO data logger graphs, both graphs are for a four (4) day period before and after the Compress Shield™ treatment.

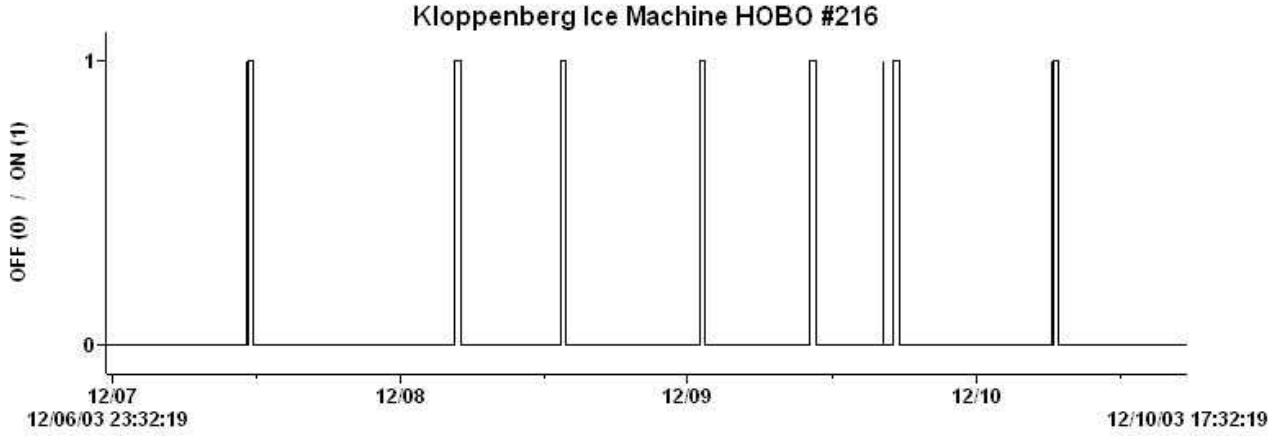
(The graphs are on the next page for easier comparative purposes)

HOBO Data Logger Graphs of Unit #3

Before Compress Shield® Treatment



After Compress Shield® Treatment



The “spikes” and apparent short cycling is not present at any time after the Compress Shield™ treatment.

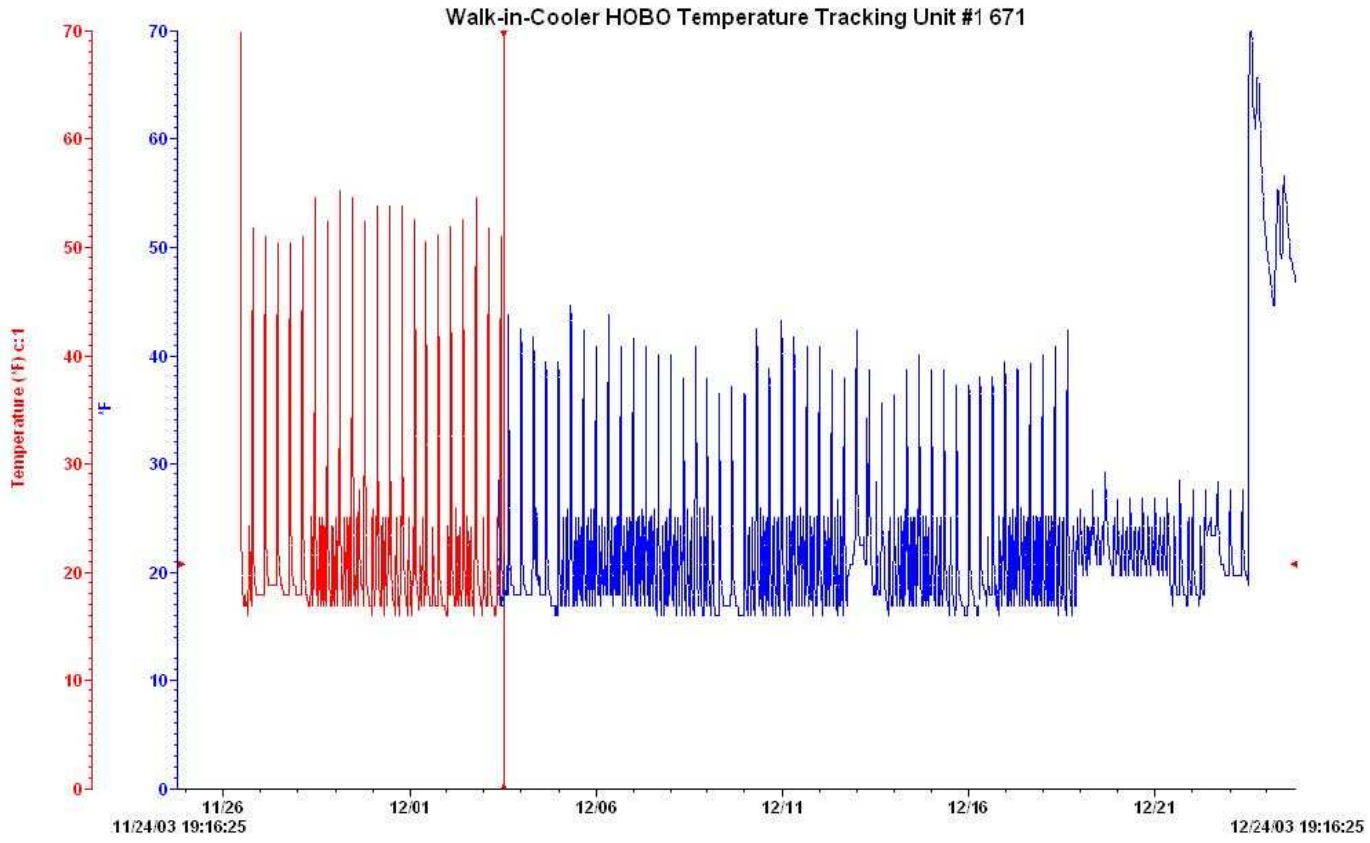
Unit #4 Walk-in-Cooler – Freon R-22

The Walk-in-Cooler has a small one (1) ton Copeland compressor. The discharge pressure dropped from 110 PSI to 100 PSI post treatment, a 9.1% decrease. The head pressure, or discharge pressure was well within the specifications for this cooler, so we did not experience a significant drop in either the discharge or suction pressure. The suction pressure dropped from 30 PSI to 29 PSI post treatment, or 3.3%. The evaporator core temperature was reduced by 1°F, from 7°F to 6°F. Although not a significant drop, it appears that the Compress Shield™ treatment did improve the efficiency in another area as indicated by the graph on the following page. The defrost temperature was reduced by 12°F, as indicated by the reduced “spikes” on the graph. The defrost time and temperature has been reduced due to the increased efficiency in the evaporator which causes less ice build up on the evaporator. This will equate to the cooler holding the desired temperature longer which, in turn, requires less compressor run time, therefore saving energy.

It appears the temperature HOBO data logger may have been knocked off of the condensor fan box on the 19th of December. That is probably why the data appears to be inconsistent with the prior weeks data after that date. All data from the 18th of December forward should be ignored.

HOBO Temperature Data Logger Graph of Unit #4

This graph is a composite of the before and after treatment for easier comparison. The vertical red line indicates the treatment date and time.



The reduced defrost temperature should reduce the demand placed on the one (1) ton compressor to maintain the desired temperature in the cooler. The overall average of the cooler, including the defrost temperature was reduced by 6°F. The graph clearly shows that the Compress Shield™ treatment has had a significant effect on the small compressor, the evaporator and condensor.

Unit #5 – Walk-in-Freezer – Freon R-502

The freezer has a five (5) ton Copeland compressor running with R-502 freon. The discharge pressure dropped 6.3% from 160 PSI to 155 PSI post treatment. This is a 3°F drop in the condensor coil which is relatively insignificant for a freezer running at this low

temperature. However the suction pressure increased from 18 PSI to 20 PSI, which is good for a freezer since that means the evaporator core temperature decreased from -16°F to -13°F, an 18.75% increase in thermal efficiency!

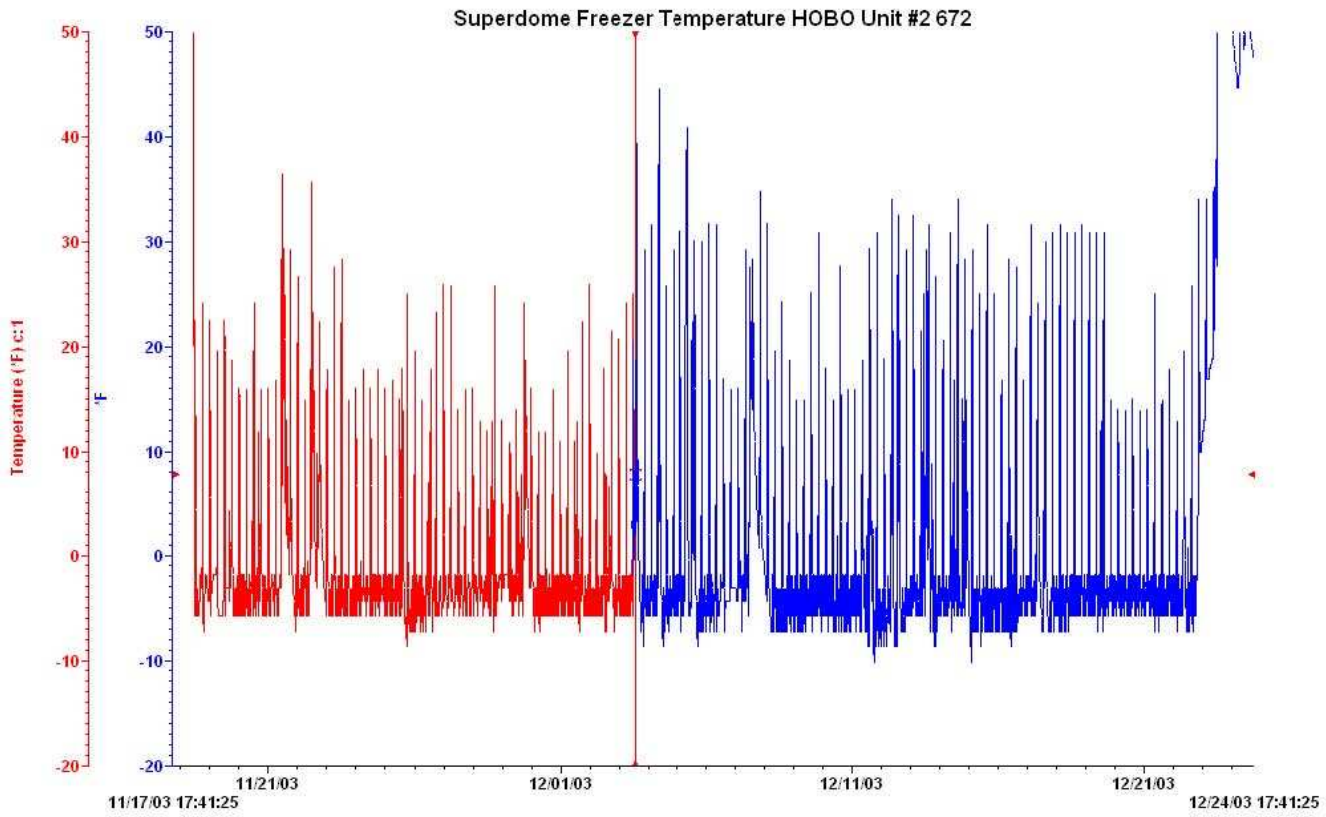
The following HOBO data logger graph for this freezer indicates several things changed post Compress Shield™ treatment. First, you will notice that the freezer remains in the defrost cycle longer, allowing the

temperature to rise higher than before treatment. This is due to the increase in thermal efficiency. The freezer does not have to run as hard to maintain temperature, so it allows longer defrost cycles.

You will also notice that pre-treatment, -6°F is the normal floor for the freezer temperature. Post treatment the floor is about -8°F and when there is an increased demand, the freezer easily lowers to –10°F. The freezer is working less, as the defrost cycle indicates, but maintaining temperature of around -8°F.

HOBO Temperature Data Logger Graph of Unit #5

This graph is a composite of the before and after treatment for easier comparison.



The next data logger graph takes a time slice of a day, using the same times of that day, before and after the Compress Shield™ treatment. It indicates the compressor cycle times are longer, which eliminated the short cycles as seen in the before treatment graph. The data

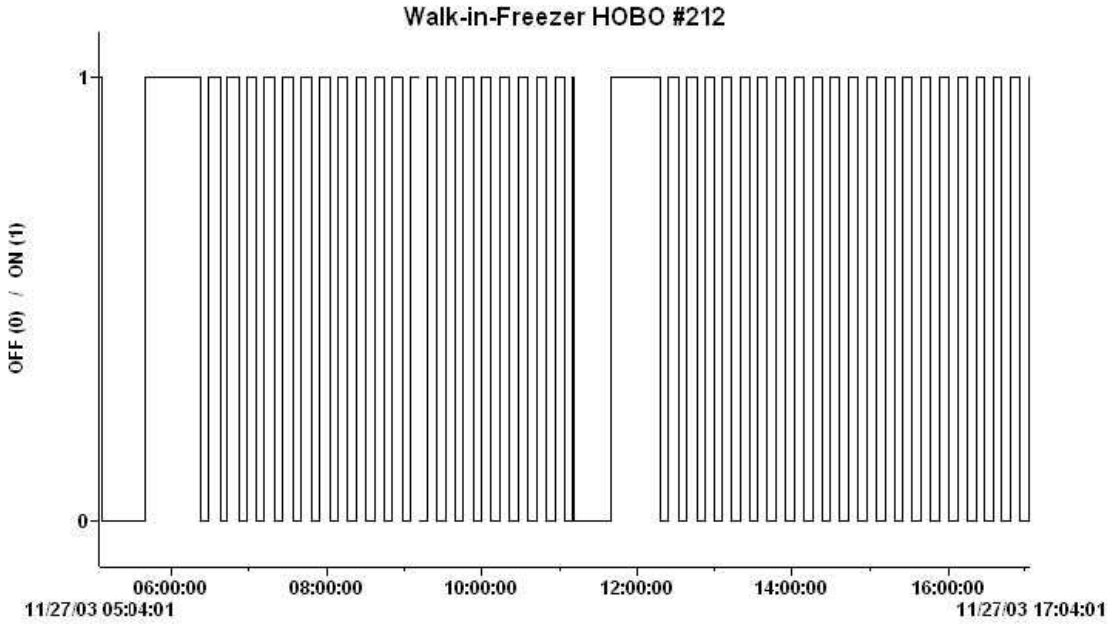
loggers show that all of the days before and after the treatment have the same pattern.

The longer run times coupled with the increased thermal capacity will reduce the wear and tear and extend the life of the compressor as discussed previously in this report.

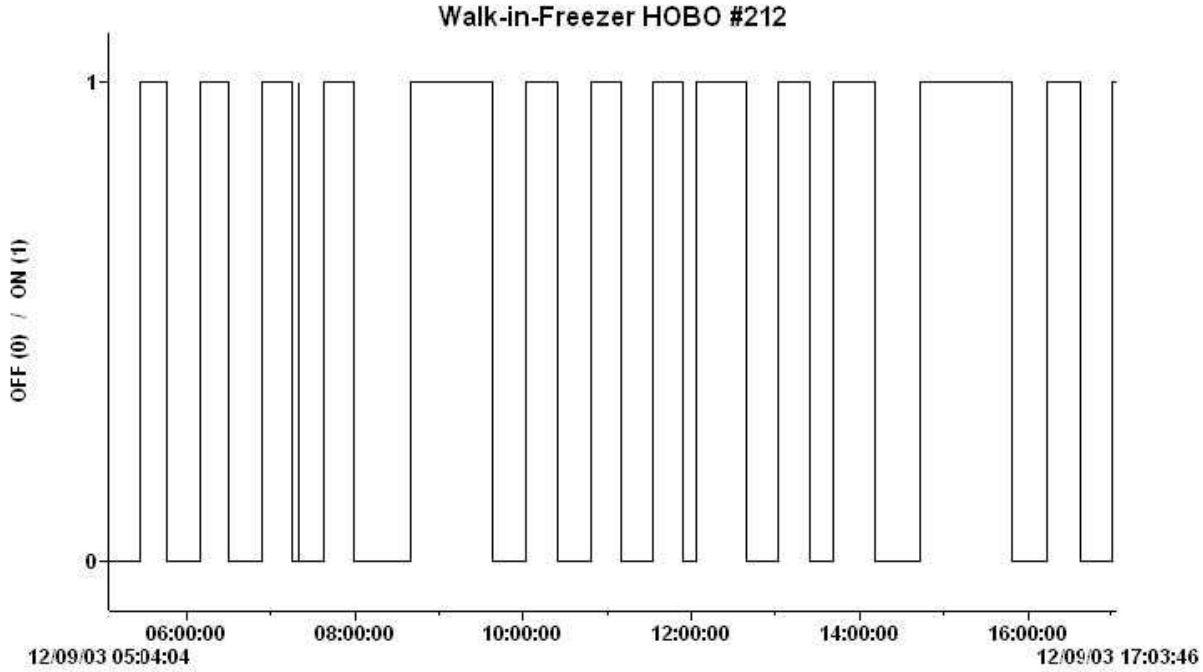
(Compressor run time graph next page)

HOBO Data Logger Graph of Unit #5 – Compressor Run time

Before Compress Shield® Treatment



After Compress Shield® Treatment



This field test report clearly shows the value of Compress Shield™. It not only increases heat transfer and thermal efficiency, but will also considerably reduce maintenance costs, prolong equipment life and reduce electrical consumption.

Compress Shield™, when installed in all of the equipment in a building, the HVAC, low temp, ice machines and any other refrigeration equipment located in a given building, will also considerably reduce demand charges on the energy bills. This is a direct result of the increased lubricity Compress Shield™ instills in the treated oil. The lubricity of the oil is increased by 1,500% according to independent lab tests conducted on Compress Shield™.

Further support for the results of these Superdome low temp treatments, are numerous independent lab and field tests that have been conducted on Compress Shield™, including the Federal Government's tests that are described in the Federal Energy Management Report ("FEMP Report"). Compress Shield™ is approved for purchase by all Federal Agencies and by the State of Florida Energy Department for State government buildings, schools, county and city buildings. We know of no other PROA that can make this claim. All of the referenced tests are immediately available upon request.

All data from the HOBO data loggers has been saved and is available upon request.

Any questions should be directed to Terry L. Colbert at Nakahoma, Inc. at 702.296.3484.

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