Power Knot LLC

501 Valley Way

Milpitas CA 95035

USA

+1-408-889-8433

www.powerknot.com

Efficiency Gain at Freedom, Bangalore

Report on the Treatment of one AC System

1 Summary

Power Knot's distributor in India, Protronix Energy, working with Kool Nest Pvt Ltd treated a packaged unit air conditioner with a Synthetic Refrigerant Catalyst at Freedom Garments Showroom in Bangalore. After treatment, the system was operating quieter and more efficiently. This was a proof of concept (POC) that impressed the experienced technicians at Kool Nest and demonstrated real benefits of the Synthetic Refrigerant Catalyst from Power Knot.

2 Introduction

2.1 The Problem

The system selected for the POC was a system from Blue Star. Blue Star has, over a period of time, established itself as an expert in the field of central air conditioning and commercial refrigeration.

This a/c system had been in service for nine years and the customer wanted to reduce energy consumption.

Figure 1. Typical A/C system from Blue Star

2.2 The Solution

The Synthetic Refrigerant Catalyst from Power Knot improves efficiency of a cooling system and saves customers money. It is injected into the refrigeration circuit of the cooling system and improves heat transfer by eliminating the "oil fouling" that occurs in a cooling system.

Power Knot guarantees a minimum of 10% savings after the application of the Synthetic Refrigerant Catalyst. In the case of Freedom, this will mean the treatment will pay for itself within nine months.

3 About the Cooling Equipment

The details of the a/c system are listed in figure 3.

4 Test Procedure

This was a proof of concept. As such, Protronix Energy decided not to monitor power for a week in advance. Instead, we measured current consumption of the system and the temperature of the air fed to the store.

Figure 2. MG Road in Bangalore

Manufacturer	BLUE STAR
Model	DPA 661 R1
Installed	2001
Cooling capacity	5.5 tons (19 kW)
Compressor	Scroll
Refrigerant	R-22

Figure 3. Specification for A/C System

Amount of refrigerant	2.5 litres
Voltage	415 V, 50 Hz, 3 phase
Current	6.6 A nominal running

Figure 3. Specification for A/C System (Continued)

Prior to treatment, we measured the key parameters of the system as listed in figure 4. Although the measured parameters seem to indicate there is to much subcool, we proceeded to treat the system.[1]

Suction pressure	60 psig	0.52 MPa	
Suction temperature	39°F	4°C	
Superheat	5°F	3°C	
Discharge pressure	240 psig	1.76 MPa	
Liquid line temperature	63°F	17°C	
Sub-cool	51°F	29°C	

Figure 4. Pressures and temperatures on the a/c system prior to treatment

The system was treated Synthetic Refrigerant Catalyst and then the measurements of power and ventilation temperature were made again.

5 Improvements After Treatment

The first thing we noticed is that the compressor noise decreased immediately. We then recorded that the power consumption had decreased and the temperature of the air coming out of the supply duct also decreased. The recordings are listed infigure 5.

Parameter	Before treatment	After treatment	Comment
Compressor noise	loud	quiet	subjective observation for better working environment
Duct temperature	15°C	12°C	significant increase in cooling within 15 minutes
Power consumption	6.2 A	5.9 A	5% savings within 30 minutes

Figure 5. Observations of increase in efficiency on Blue Star a/c system

1. The reason for the high subcool was not investigated further. It may be because the metering device needs adjusting or because there is too little charge in the system. However, the superheat is a little low, which also indicates too little refrigerant (or insufficient load). Power Knot have recommended to the customer to rectify the situation.

6 Credits

Power Knot would like to thank the management and staff of Freedom for their purchase order placed with Protronix Energy. We are also grateful to Mr. Charles Godfrey, Director, and technicians Sunil Melvin and Shameel at Kool Nest who assisted with this POC.

7 Conclusion

Through the application of the Synthetic Refrigerant Catalyst, Power Knot guarantees a gain in the efficiency of a refrigeration system of at least 10%. This study has shown that treatment has improved the operating efficiency of the system. The payback period for this customer for the treatment of the a/c system is approximately nine months.

This is an example of the benefits of the Synthetic Refrigerant Catalyst supplied and supported by Power Knot. For more information on the Synthetic Refrigerant Catalyst, please contact your local sales representative or send an e-mail to Power Knot at powerknot@powerknot.com.

Power Knot provides safe and economically sound solutions for businesses seeking to reduce energy costs and their carbon footprint through maximizing the efficiency of their cooling systems. Power Knot works with commercial, industrial, and military customers globally to reduce cooling system energy usage, improve energy efficiency, provide colder air, reduce maintenance expenses, and increase the lifetime of the systems. Their technologies are proven and available today, have been in reliable use for many years, and offer a payback period typically of less than two years. For more information, access www.powerknot.com.

Copyright © 2010–2011, Power Knot LLC. All rights reserved. 2011-02-24.