



Performance Test Results

Thermo King Spectrum SL 2

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Executive Summary:

IceCOLD Green Technology was installed on a Thermo King Spectrum SL 2 as a proof of performance to validate the energy savings claims of the technology. The proof of performance test resulted in a direct **diesel consumption savings of 32.7%**. This result is in line with historical performance of IceCOLD technology in mobile refrigeration units. In addition, this result was accomplished with the installation of **approximately 75% of the prescribed amount of IceCOLD** for the tested unit.¹ These performance results were validated by other key statistics observed during the test protocol:

- * 28,6% reduction in overall Run Time

- * 41,7% reduction in First Period Cool Down time

- * 5,2 °C reduction in average Supply Air temperature

Objective:

The study's objective was to substantiate the performance claims made by IceCOLD Green Technology regarding energy savings in the form of diesel consumption from the installation of the technology in mobile refrigeration units. Numerous factors impact the energy savings realized - these include the age and working condition of the systems as well as the unique physical demands of the operating environment.

Methodology:

The unit selected for the test was a Thermo King Spectrum SL 2 manufactured in 2005. The proof of performance installation was performed by GreenFreez representatives Cliff Canipe,

¹ At the initial pre-install test it was noted that the test unit had a deep sump compressor (X430RL; 490 cm³). The oil capacity of a regular sump compressor is 4,9 liters and the deep sump is 6,5 liters. The initial computation for the installation was based on 4,9 liters, i.e., 490ml of IceCOLD. It was decided to treat the system with the initial prescribed amount instead of increasing the amount to 650ml. This resulted in only treating the unit with 75% of the prescribed amount of IceCOLD.

CEO and Pierre Kloppers, Chief Technician and licensed HVAC technician. The test was supervised by the client's technical manager and the maintenance technician for GEA Gresco Refrigeration (South Africa Thermo King OEM authorized distributor and maintenance provider). The steps of the test methodology were carefully monitored and conducted with exacting precision in order to ensure accurate and reliable results. They included the following:

- * Installation of four Onset Computer Corp HOBO data loggers
- * The data loggers recorded the following data at 10 second intervals:
 1. Suction line temperature
 2. High pressure temperature
 3. Incoming and outgoing condensing air temperature
 4. Return air temperature inside the trailer
 5. Supply air temperature inside the trailer
 6. Interior trailer temperature in the middle of the trailer
 7. Interior trailer temperature in the rear of the trailer
 8. Exterior ambient temperature
- * The unit was initially run up to 20 °C via the on board Smart Reefer Controller.
- * Set point temperature was set to 0 °C and the unit ran in Cycle-Sentry mode until the set point was reached.
- * The unit was then turned off, the doors opened, and the interior ambient temperature was raised to approximately 16 °C.
- * The doors were shut and the unit was run up to 20 °C for a second time.
- * The diesel tank supply line was removed from the permanent tank and inserted in a small calibrated container.²
- * Set point temperature was again set to 0 °C and the unit ran until the set point was reached and was then allowed to run through one complete cycle where the temperature went up to approximately 3 °C and then back down to 0 °C.

² This was done in order to ensure an accurate reading of the amount of diesel used for the test pilot run period. See Appendix C for test pilot photographs.