C A S E S T U D Y

RS-51 (R470B) vs. R404A

at Leidy's Pork Products in Pennsylvania

SUMMARY

The performance results of the new refrigerant RS-51 (R-470B) tested in a Pennsylvania meat processing plant's commercial cooling unit shows a 9% better COP of RS-51 vs R404A and an 11% lower energy consumption rate of RS-51 vs R404A.

INTRODUCTION

Climate change is a world-wide concern. Governments around the world and the Environmental Protection Agency in the United States — as well as individual state governments — have been actively establishing regulations to reduce the use of products with high Global Warming Potential (GWP), such as HFC refrigerants.

Following the government initiatives over the past several years, forward-thinking companies are actively developing strategies and policies to reduce their use of high GWP refrigerants. One such strategy is to prolong the useful life of their existing A/C and refrigeration equipment by retrofitting them with low GWP refrigerant alternatives. See what Leidy's Pork Products discovered during side-by-side testing.

PRODUCT DATA & APPLICATION

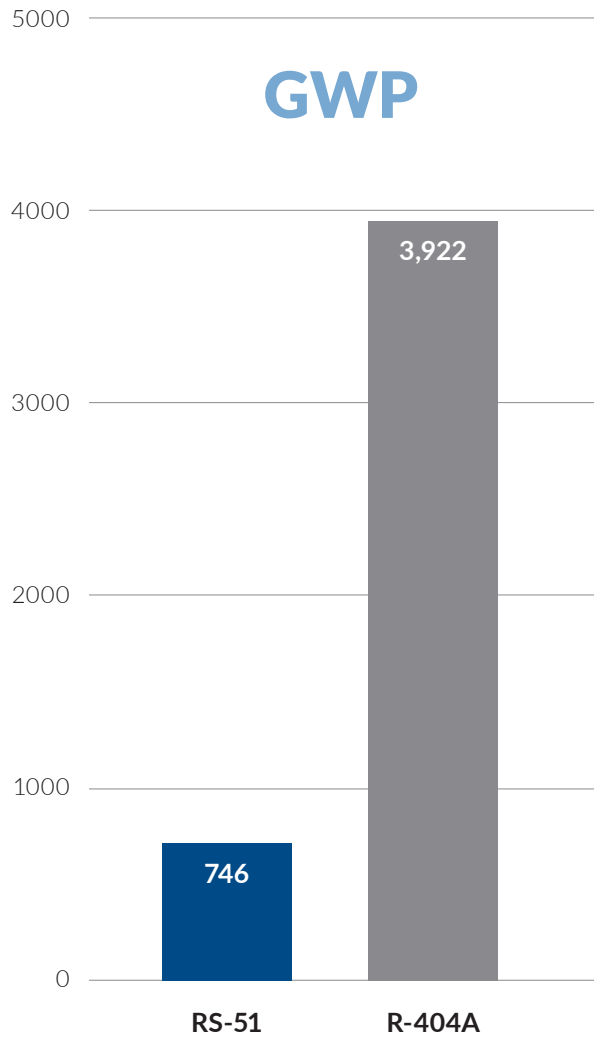
RS-51 (R470B) is a HFO blend, non-flammable drop-in replacement for R404A and R507 with a GWP less than 80% of R404A with similar thermodynamic performance. Also, RS-51's GWP is approximately 40% less than R448A and R449A. RS-51 can be used in all applications and systems where R404a and R507 are being used.

OBJECTIVE

Leidy's Pork Processing Plant in Souderton, Pennsylvania had a goal to test the effectiveness of a low-GWP refrigerant to replace the high-GWP refrigerant, R404A (GWP of 3,922). The ultra-low GWP non-flammable retrofit HFO blend replacement, RS-51 (R470B) has a GWP of 746.

REFRIGERANTS

- **R-404A**
- **RS-51 (R-470B)**



SYSTEM COMPONENTS

System Equipment: **Heatcraft /Bohn Condensing**

Unit Model: **BCD0700MABX-(2)-HCL50AF Bohn-Heatcraft**

Compressors: **Copeland Compressors, Qty.: (2) Model# 6DKNR35ME**

Evaporators**: Heatcraft Evaporators, Qty: (2) Model# HCLSOAF**

Conditions:

- **Air Handlers Testing Done with bottom 1/2 of each Coil per unit, CFM/per unit 24,000 CFM with Sporlan EEV.**
- **Climate Class Wireless DigitalPressure, Psychrometer Probe and Temperature Clamps for measurement.**
- **Test Date: 8/21/2024**
- **Test Site: Leidy's Pork Processing Rooms**
- **Ambient DB 69.9, WB 56 8**

TESTING NOTES

Upon the installation of a new 22-ton system capacity, two circuit R404A system in April 2024 (35 hp per condensing unit), one circuit was charged with RS-51 (R470B) and the other with R404A. Both circuits were performing up to expectations.

At the end of July and then again, the end of August system testing was conducted to compare the performance of RS-51(R470B) and R404A, with specifics below.

Two key performance numbers are very remarkable:

- 9% better COP of RS-51 vs R404A
- 11% lower energy consumption of RS-51 vs R404A.

RS-51 (R470B)
Room # 138

R404A
Room # 137

TESTING RESULTS

EVAPORATOR

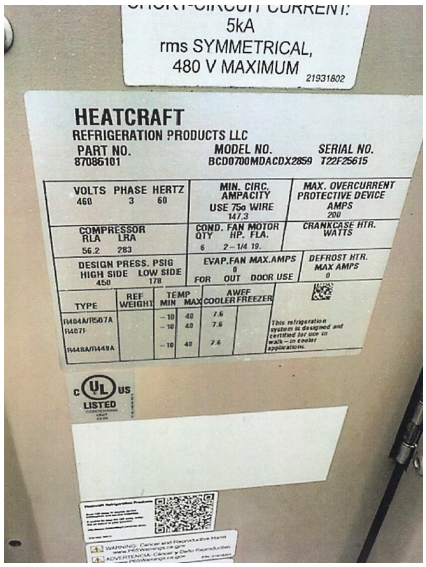
Refrigerant	Room Name	Room Temp	Return DB	Air WB	Supply DB	Air WB	ENTHALPY H	Refrigerant BTU/HR
RS51/R470B	138	39	47.1	44.4	34.9	33.8	4.9	264,600
R404A	137	39	43.7	41.4	30.5	30.1	5	270,000

CONDENSING UNIT

Refrigerant	Room Name	Room Temp	Suction Press./ Temp	Evap Temp	Discharge Press./ Temp	Comp/ Amps	Volts	Mtr Watts	Cop
RS51/ R470B	138	39	36.4 psi/ 28°F	25°F	228.6 psi/ 119°F	39	463	31,275	8.46
R404A	137	39	60.1 psi/ 24°F	21°F	235.9 psi/ 101°F	43.6	463	34,964	7.72

Installing Electrical/Mechanical Contractor: Schoeller's Inc., Perkasie, PA


SOUDERTON


5kA
rms SYMMETRICAL,
480 V MAXIMUM
HEATCRAFT
REFRIGERATION PRODUCTS LLC
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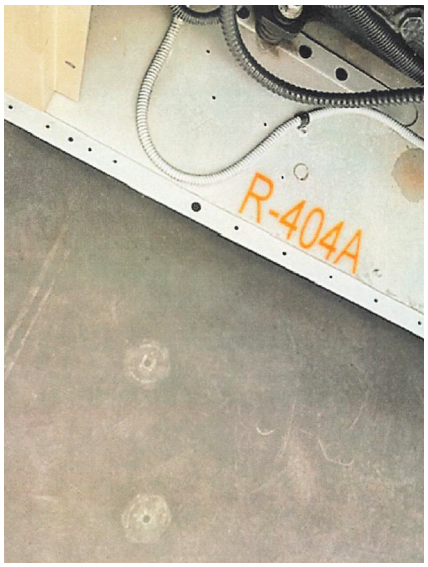
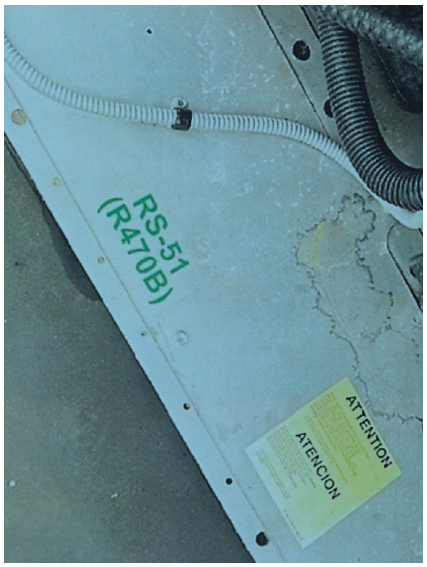
SERIAL NO.
T22F25615


R-404A


RS-51
(R470B)
ATTENTION
ATENCION