

R-515B FOR A/C IN SEVERE DUTY OPERATOR CRANE CABINS

Case Study

Philip Doyle Manufacturing Replaces R-124 and R-134a with Solstice® N15 (R-515B) in Critical High-Ambient Industrial Applications

KEEPING THE METALS, MINING, AND CONSTRUCTION INDUSTRIES HUMMING

Heavy equipment operators, such as those who run overhead cranes, work in high-stress, high-heat, dusty, and corrosive environments. Overhead crane cabins are enclosed to protect the operator from the environment as well as from an accidental fall.

Unlike mobile or construction cranes, overhead cranes are typically used for either manufacturing or maintenance applications, where efficiency or downtime are critical factors. Overhead cranes are commonly used in the refinement of steel and other metals and mining industry such as copper smelters and aluminum mines, as well as in pulp and paper mills, to move heavy press rolls and equipment.

Early crane operators did not have sophisticated A/C systems in the cabins as they do today. The heat in the crane cabin often reached sweltering temperatures, requiring frequent safety breaks, and impacting productivity. With the invention of small-format climate control systems, including heating and air-conditioning, innovative manufacturers like Philip Doyle helped crane cabins make a quantum leap in comfort for operators, making it possible

to spend more uninterrupted time at the controls, and increasing productivity.

TWO CHALLENGES, ONE SOLUTION: SOLSTICE N15 IS A LONG-TERM REPLACEMENT FOR BOTH R-124 AND R-134A

"Some crane A/C suppliers converted from R-124 to pure R-227ea, which is only about 30 percent effective and has a high GWP (3220*)," said Basil Mendonca, project manager, Philip Doyle Manufacturing. "R-134a has a GWP of 1430 and has an operating temperature limit (compressor operating envelope) of about 55° C. Solstice N15 is suitable up to 90° C."

The supply of R-134a will be affected by the global HFC phasedown under the Kigali Amendment to the Montreal Protocol, which will require a 40% reduction in the production of new HFCs from the 2011-2013 baseline by January 1, 2024.

When Philip Doyle learned about Solstice N15 (R-515B), they decided to test it for their prototype units.

Solstice N15 (R-515B) is a blend of R-1234ze (GWP=6), and R-227ea, which imparts the desired

THE OPPORTUNITY

The ban on R-124 in Canada led Philip Doyle Manufacturing, custom A/C system fabricator for heavy duty overhead cranes and other severe duty A/C products, to seek a replacement refrigerant that would meet its customers strict requirements: nonflammability, longevity as an environmental solution, and suitability for temperatures up to 90°C (194°F).

THE SOLUTION

Philip Doyle selected Honeywell Solstice® N15 (R-515B) refrigerant, satisfying Philip Doyle's stringent design and operating requirements and keeping overhead crane operators cool for decades to come.

"Honeywell provided a product that is sustainable, nonflammable, **highly efficient** and handles our high-temperature severe duty needs in the toughest industrial applications."

**BASIL MENDONCA, PROJECT MANAGER,
PHILIP DOYLE MANUFACTURING**

Honeywell

nonflammable characteristic. The result is a long-term solution in the severe-duty application that is both nonflammable and has a GWP of 292, which meets global warming potential requirements for refrigerants.

NEW REFRIGERANT, NEW EQUIPMENT

“The search to find a viable replacement for R-124 took some time and we needed to make some design changes to optimize equipment performance. For example, the condensing section was redesigned for a higher heat rejection, as the cooling capacity of Honeywell’s R-515B is higher than R-124. We also redesigned our electronic components. In the end, we have a completely redesigned and optimized unit, and we are quite happy with the performance,” said Mendonca.

So are Philip Doyle’s customers. With long-term customer relationships built over more than five decades, Philip Doyle customers are eagerly awaiting delivery on their new equipment orders.



HONEYWELL SOLSTICE N15 (R-515B)

R-515B is a nonflammable/nontoxic replacement for existing HCFCs or HFCs, with the lowest GWP available for severe-duty A/C applications.

- Blend of R-1234ze and R-227ea (91.1%/8.9%)
- Nonflammable (ASHRAE A1), safe for use in high-ambient A/C applications
- GWP 292, 50% lower than R-124 (609) and 80% lower than R-134a
- Azeotropic blend with zero glide, simplifying the equipment design process

For more information

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*All global warming values cited reflect the measurements in the 4th Assessment Report of the International Panel on Climate Change (IPCC AR4).

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