THE INTERNATIONAL SYMPOSIUM ON
NEW REFRIGERANTS AND ENVIRONMENTAL TECHNOLOGY 2025

Features of multi air conditioning system for buildings using R32 refrigerant

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Keywords: R32 refrigerant, carbon neutral, low GWP, reduced installation requirements, energy efficiency, refrigerant leakage suppression

EXTENDED ABSTRACT

In recent years, addressing various societal challenges surrounding air conditioners has become urgent. These include reducing environmental impact to prevent global warming and achieve carbon neutrality, rising energy prices, and labor shortages in installation and maintenance. Furthermore, enhancing comfort is also crucial. Against this backdrop, our company will transition the refrigerant in multi air conditioning system for buildings sold in the Japanese domestic market from the conventional R410A to R32. R32 offers a Global Warming Potential (GWP) approximately one-third that of R410A and superior energy efficiency. Taking this refrigerant conversion to R32 as an opportunity, we have enhanced this product across seven key areas demanded of air conditioners: energy efficiency, environmental performance, comfort, safety design, reduced installation requirements, inter-device coordination, and air quality visualization. This contributes to solving societal challenges.

Feature 1: Optimization of key components to maximize the characteristics of R32 refrigerant

In developing this new series, we adopted a new compressor and heat exchanger that leverage the characteristics of R32 refrigerant. This enabled the VRV-RX series, a high-grade model for simultaneous cooling and heating, to achieve high energy efficiency with an average cooling/heating COP improvement of up to 11%. (Fig. 1)

Feature 2: Efforts to suppress refrigerant leakage and reduce installation work

To suppress refrigerant leakage caused by variations in flaring and brazing workmanship, we developed new ISO 14903-compliant threaded fittings. We implemented an “all-threaded construction” approach, using these threaded fittings (non-brazed fittings) for all field piping installation from the outdoor unit to the indoor unit. This achieved both high environmental performance and reduced construction time. (Fig. 2)

Feature 3: Achieving both energy efficiency and comfort through 'Optimized Room-by-Room Air Conditioning'

By utilizing the safety device (refrigerant leak shut-off valve) essential for adopting R32 refrigerant to optimize refrigerant temperature for each indoor unit during operation, we have achieved both energy savings through reduced start-stop losses and enhanced comfort.

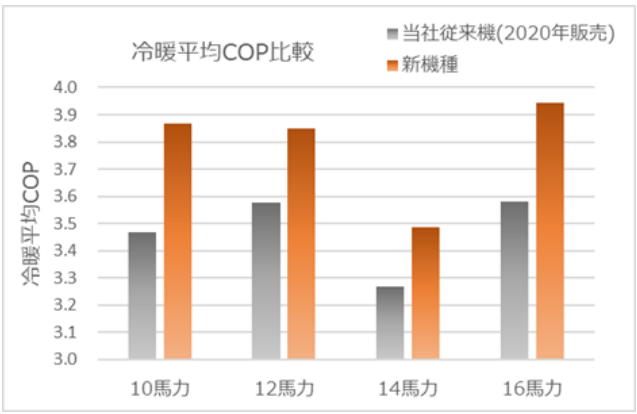

Fig.1 Average COP Comparison for Heating and Cooling

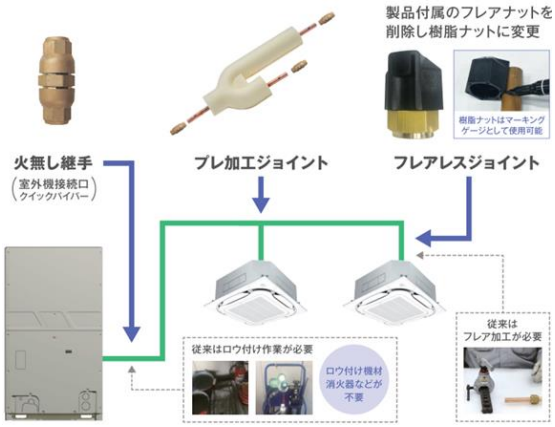

Fig.2 “all-threaded construction” concept

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R32 冷媒を用いたビル用マルチ製品の特長

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EXTENDED ABSTRACT

近年、地球温暖化防止やカーボンニュートラル実現に向けた環境影響の低減や、エネルギー価格高騰、施工・メンテナンスの人手不足など、空調機を取り巻く様々な社会課題への対応が急務となっています。また、さらなる快適性向上も重要です。こうした中、当社は、日本国内市場で販売するビル用マルチエアコンの冷媒を、従来の R410A と比べて GWP が約 1/3 でエネルギー効率にも優れる R32 に切り替えていきます。本商品は R32 への冷媒転換を機に、空調機に求められる省エネ性、環境性、快適性、安心設計、省施工、機器間連携、空気質見える化の 7 つの観点で強化し、社会課題の解決に貢献します。

特長①　R32 冷媒の特性を最大限引き出すための主要部品の最適化

新シリーズの開発にあたり、R32 冷媒の特性を活かした新型圧縮機や新型熱交換器を採用し、冷暖同時機のハイグレードモデルである VRV-RX シリーズにおいて、冷暖平均 COP を最大 11%向上という高い省エネ性を実現しました。(図. 1)

特長②　冷媒漏洩の抑制と省施工の取り組み

フレア加工やろう付けの施工バラつきによる冷媒漏えいを抑制するため、ISO14903 適合のねじ接合接手を新たに開発し、室外機から室内機までのすべての現地配管の施工を、ねじ接合接手(火無し接手)とした『オール火無し施工』に取り組みました。これにより、高い環境性と省施工を実現しました。(図. 2)

特長③　『部屋ごとの空調最適化』による省エネ性と快適性の両立

R32 冷媒採用にあたり必須となる安全装置(冷媒漏えい遮断弁)を、運転時の室内機ごとの冷媒温度の最適化にも利用することで発停ロス抑制による省エネと、吹出温度の最適化による快適性向上の両立を実現しました。

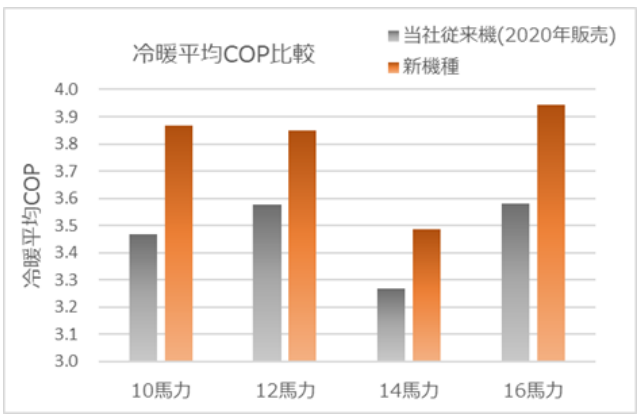

図. 1　冷暖平均 COP 比較

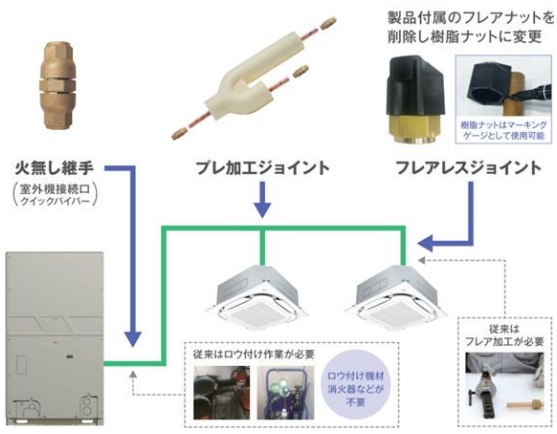

図. 2　オール火無し施工イメージ