

Multi-Refrigerant Release of Secop Compressor Types R448A and R449A

Compatible Compressor types

Various new refrigerant types have been developed by the chemical industry to offer alternative solutions to hydrocarbons while some high-GWP refrigerants will be phased out due to global regulations.

R448A and R449A are refrigerants which are designed to work as “drop-in” or replacement refrigerants for R404A. Secop ran analysis projects to verify that existing compressor types are compatible with these new refrigerants. As a result, the following compressors have been identified as being able to run with R404A as well as with R448A and R449A yet with slightly different operating limits:

Compressor	Code number	Voltage and frequencies	Motor type	Refrigerants
SC10MLX	104L2506	220-240 V / 50 Hz	CSIR	R404A, R448A, R449A
SC12MLX	104L2606	220-240 V / 50 Hz	CSIR	R404A, R448A, R449A
SC15MLX	104L2869	220-240 V / 50 Hz	CSIR	R404A, R448A, R449A
SC18MLX.3	104L2146	220-240 V / 50 Hz	CSCR	R404A, R448A, R449A
GS21MLX	107B0502	220-240 V / 50 Hz	CSCR	R404A, R448A, R449A
GS26MLX	107B0503	220-240 V / 50 Hz	CSCR	R404A, R448A, R449A
GS34MLX	107B0504	220-240 V / 50 Hz	CSCR	R404A, R448A, R449A

Authority Approvals and Identification

Until further notice, Secop will not apply for authority approvals for operation with R448A and R449A of the above listed compressors. “R448A” and “R449A” notes will not be added to the type labels of the compressors. Pages which show cooling performance and adjusted operation limits for operation with R448A or R449A will be added to the compressor datasheets.

Cooling Performance and Operation Limits with Different Refrigerants

Using the new refrigerant mixtures results in a slightly different cooling performance compared to the original refrigerant. This deviation is not similar for all operation conditions, and it is not the same for all compressor types. Besides cooling performance, this affects some important temperatures inside the compressor when the new refrigerant is used. Depending on the operating conditions and compressor design, temperature changes in the motor and pumping unit happen when comparing both refrigerants on the same compressor. As a result, the operation limits of the compressors were re-defined for operation with R448A and R449A.

Adjusted operation limits and new cooling performance are shown for the new refrigerants on separate pages in the compressor datasheets

Starting Equipment and Accessories

Changes to starting equipment or other accessories are not needed. All equipment is compatible with reference and new refrigerants.

Changing the Refrigerant Type of a Cooling System – Lessons Learned

Secop has analyzed changing the refrigerant inside a commercial cooling appliance from R404A to “new” refrigerant. We have summarized the general results below:

Use as a pure drop-in

Fill in equal mass of other refrigerant R404A → R448A or R449A no other changes

New setup works with moderate results:

- discharge gas temperature is higher
- cooling performance is lower
- energy efficiency is lower
- operating pressures are higher → risk of early safety cut off

Use as drop-in + optimization of refrigerant charge amount and capillary tube

New setup works as good as with the reference refrigerant:

- discharge gas temperature is higher
- cooling performance is lower
- energy efficiency at previous level
- operating pressures at previous level → unchanged overload behavior of cooling system

Refrigerant change in appliances with need for accurate temperature regulation

Compared to R404A, a relevant temperature glide occurs with the use of R448A and R449A. This can result in lower energy efficiency and slightly lower cooling capacity even after optimization.

Our Recommendations

Do not use R448A and R449A with SECOP compressors for LBP operation. Temperatures inside the compressors may increase to a level where safety cut-offs occur during normal load conditions.

When changing from R404A to R448A or R449A in commercial appliances, technical adaptations are needed to keep the cooling performance at the previous level and to avoid safety cut-off inside typical operation range.

Always optimize charging amount and capillary tube size for new refrigerant.

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