

**1. General**

Regulation (EU) No. 517/2014 on fluorinated greenhouse gases (EU F-gases regulation) is limiting use of refrigerants with high GWP values (GWP – Global Warming Potential). Embraco offers full product line of HC (Hydrocarbons) compressors as a final solution to meet EU F-gases regulation. A series of intermediate GWP blends were proposed in order to bridge the transition to the final situation. Embraco already approved:

- R452A as an alternative refrigerant for both LBP (low back pressure) and MBP (medium back pressure) applications maintaining the original R404A operating envelope (ECN R452A 2016).
- R449A as an alternative refrigerant only for MBP applications with restricted operating envelope (ECN R449A 2018).

Other transition alternative blend to R404A is HFC blend R448A. The main physical proprieties are indicated in the table below:

Parameter	R 404A	R448A
Type	HFC blend	HFC blend
Safety Class	A1	A1
Boiling Temp @ 1atm	-47 °C (-53 °F)	-45 °C (-49 °F)
Critical Temp	72 °C (162 °F)	84 °C (180 °F)
Temp Glide Bubble-Dew @1 bar(abs)	0.8 K	6.3 K
GWP (100y)	3920	1386

**2. Declaration**

Embraco, after performing extended reliability testing program on R448A concluded following:

**Embraco approves R448A as an alternative refrigerant for Embraco R404A compressor series NEK, NEU\*, NT, NJ only for MBP application with limited operating envelope defined in Figure 1. It is important to respect restricted envelope while operating compressor with R448A to guarantee reliable operation because of much higher thermal profile. Electrical components are the same as originally defined for R404A. Compressor unit label and nomenclature will not change. IEC compliance has to be performed on complete appliance. If application is using Embraco R404A compressor with R448A, but outside above mentioned restricted envelope, please contact Technical assistance for further instructions.**

\* for more details about NEU family please contact Technical assistance.

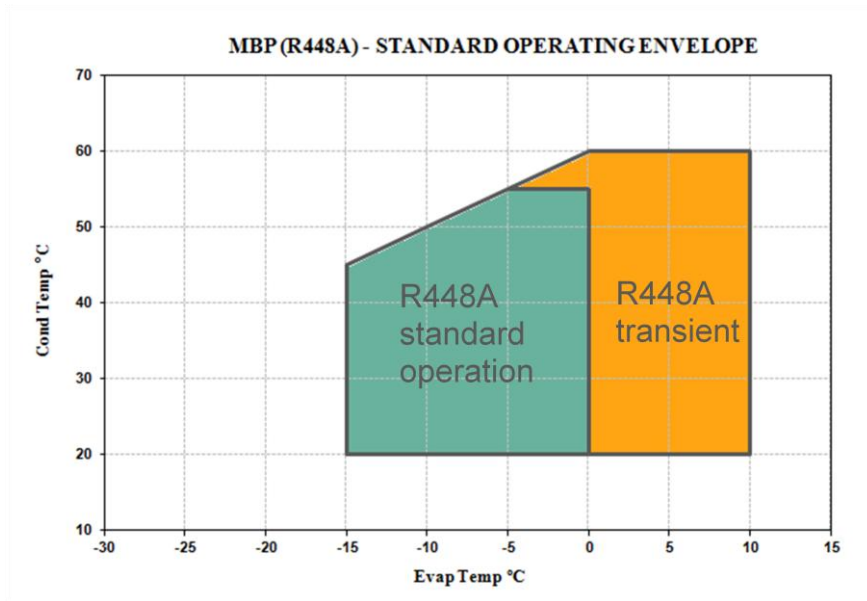


Figure 1. New limited operating envelope for R448A, return gas temperature 20°C, Evaporating range: -15 °C to 0°C for standard operation  
NEK / NEU\* / NT / NJ series

### 3. Performances

Refrigerant R448A, according to the calorimetric evaluation is showing impact on cooling capacity and COP depending on operating conditions. Final impact on performances has to be verified on specific application.

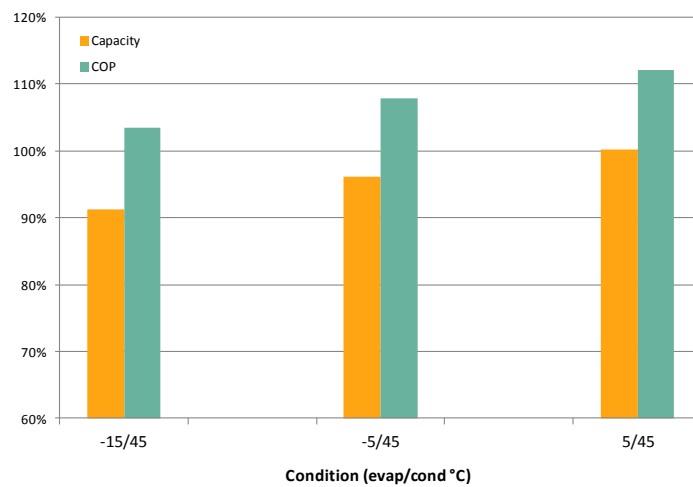


Figure 2. Calorimeter performance of R448A with baseline of R404A.