

## 4성분계 냉매혼합물의 성능평가

앞에서 언급된 3성분계 냉매혼합물 성능평가와 동일한 절차에 의해서 기존특허로 이미 나와있는 4성분계 혼합냉매는 냉동성능 평가대상에서 제외하고 나머지 조합가능한 4성분계 냉매혼합물에 대하여 조성비율을 바꾸어가며 성능을 평가하여 HCFC-22 대체용으로 사용될 수 있는 4성분계 시스템 및 조성비율을 범위를 위해 여러 종류의 4성분계 냉매혼합물을 구성하여 계산한 결과 R-22를 대체할 수 있는 성능을 나타낸 혼합냉매의 종류는 39가지 였다. HCFC-22 대체가 가능한 4성분계 냉매혼합물의 구성성분 및 조성비율은 다음과 같이 요약된다.

### 1) R-32/125/143a계

- i) R-32/125/143a/C270 = 28-40wt%/0-40wt%/10-58wt%/0-20wt%
- ii) R-32/125/143a/227ea = 28-70wt%/0-50wt%/0-60wt%/0-30wt%
- iii) R-32/125/143a/245cb = 30-80wt%/0-45wt%/0-50wt%/0-40wt%
- iv) R-32/125/143a/600a = 38-50wt%/0-40wt%/10-40wt%/0-10wt%
- v) R-32/125/143a/C318 = 30-48wt%/10-40wt%/20-50wt%/0-20wt%
- vi) R-32/125/143a/236ea = 35-70wt%/10-50wt%/10-40wt%/0-20wt%
- vii) R-32/125/143a/600 = 35-60wt%/10-40wt%/10-40wt%/0-10wt%
- viii) R-32/125/143a/E134 = 40-88wt%/0-40wt%/0-30wt%/0-10wt%
- ix) R-32/125/143a/E245 = 40-85wt%/0-40wt%/0-38wt%/0-10wt%

### 2) R-32/125/134a계

- i) R-32/125/134a/C270 = 10-60wt%/10-50wt%/10-50wt%/5-40wt%
- ii) R-32/125/134a/152a = 20-70wt%/5-40wt%/5-50wt%/2-40wt%
- iii) R-32/125/134a/227ea = 30-70wt%/2-50wt%/2-50wt%/2-40wt%
- iv) R-32/125/134a/245cb = 30-70wt%/3-30wt%/2-50wt%/2-30wt%
- v) R-32/125/134a/C318 = 30-60wt%/5-40wt%/5-50wt%/2-30wt%
- vi) R-32/125/134a/236ea = 40-70wt%/5-40wt%/7-40wt%/5-20wt%
- vii) R-32/125/134a/E134 = 40-80wt%/0-35wt%/0-43wt%/0-10wt%
- viii) R-32/125/134a/E245 = 40-80wt%/0-38wt%/0-35wt%/0-10wt%
- ix) R-32/125/134a/601 = 35-90wt%/0-45wt%/0-38wt%/0-5wt%
- x) R-32/125/134a/601a = 40-80wt%/0-35wt%/0-35wt%/0-6wt%

3) R-32/143a/134a계

- i) R-32/143a/134a/152a = 10-70wt%/10-60wt%/10-50wt%/10-40wt%
- ii) R-32/143a/134a/227ea = 30-70wt%/10-50wt%/10-50wt%/10-30wt%
- iii) R-32/143a/134a/236ea = 40-70wt%/10-40wt%/10-40wt%/10wt%
- iv) R-32/143a/134a/600 = 40-70wt%/10-40wt%/10-40wt%/10wt%

4) R-32/143a/152a계

- i) R-32/143a/152a/227ea = 20-70wt%/10-50wt%/10-50wt%/10-30wt%
- ii) R-32/143a/152a/600a = 20-70wt%/10-50wt%/10-50wt%/10wt%
- iii) R-32/143a/152a/236ea = 30-70wt%/10-30wt%/10-40wt%/10-20wt%
- iv) R-32/143a/152a/600 = 30-70wt%/ 10-40wt%/ 10-50wt%/ 10wt%

5) R-32/143a/227ea계

- i) R-32/143a/227ea/600a = 40-50wt%/20-40wt%/10-20wt%/10wt%
- ii) R-32/143a/227ea/236ea = 40-70wt%/10-40wt%/10-20wt%/10wt%
- iii) R-32/143a/227ea/600 = 50-70wt%/10-30wt%/10-20wt%/10wt%

6) R-32/134a/152a계

- i) R-32/134a/152a/227ea = 30-50wt%/10-40wt%/10-40wt%/10-30wt%
- ii) R-32/134a/152a/236ea = 30-70wt%/10-50wt%/10-30wt%/10-20wt%
- iii) R-32/134a/152a/600 = 30-70wt%/10-50wt%/10-50wt%/10wt%

7) R-32/134a/227ea계

- i) R-32/134a/227ea/600a = 50-60wt%/10-30wt%/10-20wt%/10wt%
- ii) R-32/134a/227ea/236ea = 50-70wt%/10-30wt%/10-20wt%/10wt%
- iii) R-32/134a/227ea/600 = 50-70wt%/10-30wt%/10-20wt%/10wt%

8) R-32/152a/227ea계

- i) R-32/152a/227ea/600a = 30-70wt%/10-50wt%/10-20wt%/10wt%
- ii) R-32/152a/227ea/236ea = 40-70wt%/10-40wt%/10-20wt%/10wt%
- iii) R-32/152a/227ea/600 = 30-70wt%/10-50wt%/10-20wt%/10wt%