REFRIGERANTI - CLASSIFICAZIONE

- ALOCARBURI
- AZEOTROPI
- ZEOTROPI
- COMPOSTI ORGANICI
- COMPOSTI INORGANICI

- Il primo carattere a destra = numero di atomi di fluoro
- Il secondo carattere dalla destra = uno in piu' dgli atomi di idrogeno
- Il terzo carattere dalla destra = uno in meno de

Tabella 12.1 – Potenziale di degrado dell'ozono (ODP) e potenziale di riscaldamento globale (GWP) di diversi refrigeranti.

Refrigerante	Formula	ODP	GWP
CFC-11	$CFCl_3$	1,00	1,00
CFC-12	CF_2Cl_2	1,00	3,20
CFC-115	$CClF_2CF_3$	0,6	10,6
HCFC-22	$CHClF_2$	0,055	0,3
HFC-32	CH_2F_2	0	0,12
HCFC-123	$CHCl_2CF_3$	0,02	0,02
HFC-125	CHF_2CF_3	0	0,63
HFC-134a	CH_2FCF_3	0	0,31
HFC-143a	CH_3CF_3	0	0,76

Tabella 1.8 - Principali fluidi frigorigeni e loro indici ODP (potenziale di impoverimento dell'ozono) e GWP (potenziale di riscaldamento globale dell'atmosfera)

Fluido frigorigeno	ODP	GWP
CFC-11	1,0	1,0
CFC-12	1,0	2,8÷3,4
CFC-113	0,8	1,3÷1,4
CFC-114	1,0	3,7÷4,1
CFC-115	0,6	7,4÷7,6
HCFC-22	0,055	0,32÷0,37
HCFC-123	0,02	0,017÷0,020
HCFC-124	0,022	0,092÷0,10
HCFC-141b	0,11	0,34÷0,39
HCFC-142b	0,065	0,72÷0,76
HCFC-225ca	0,025	–
HCFC-225cb	0,033	–
HFC-32	0	0,24÷0,29
HFC-125	0	0,51÷0,65
HFC-134a	0	0,24÷0,29
HFC-143a	0	0,72÷0,76
HFC-152a	0	0,026÷0,033

	New Equipment	Existing Equipment
Montreal Protocol		
Developed Countries	2020[a]	2030
Article 5(1) Countries	2040[a]	2040
USA[b] and Canada	2010	2020

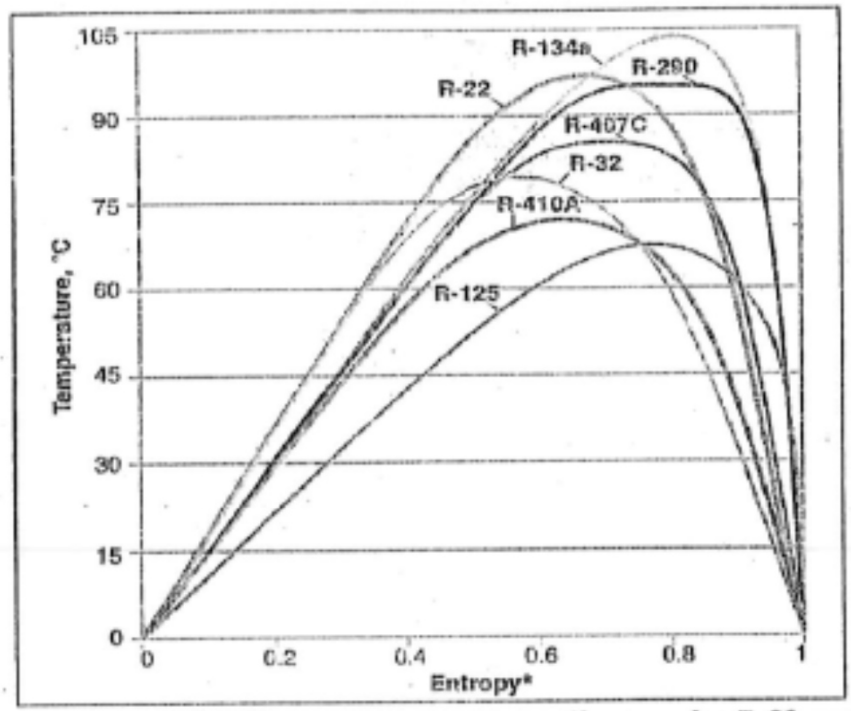
a. The Protocol imposes stepped reductions (a single freeze in 2015 for Article 5(1) countries) for collective HCFC consumption, but allows individual countries to determine how to meet those limits based on allocations between individual substances (weighted by their ozone depletion potentials, [ODPs]) and uses.
b. Pursuant to the Clean Air Act Amendments (CAAA) of 1990 and implementing regulations at 40 CFR 82.

Table 1: R-22 production phaseout (by January 1 of year indicated). These dates effect production and importation of R-22, not continued operation using existing or recycled R-22.

	Existing Equipment (May Require Conversion)				New Equipment	
R-22	R-407C	R-411A	R-417A	R-419A	R-407C	R-407E
	R-421A	R-421B			**R-410A**	R-410B
R-502	R-402A	R-402B	R-403A	R-403B	HCs	R-407A
	R-404A	R-407A	R-407B	R-408A	**R-404A**	R-509A
	R-411B	R-422A	R-507A		**R-507A**	
					HCs	

There are many additional blends in use, but their aggregate market share is very small. The table addresses only those blends that have obtained standard designations.

Table 2: Replacement blends for R-22.



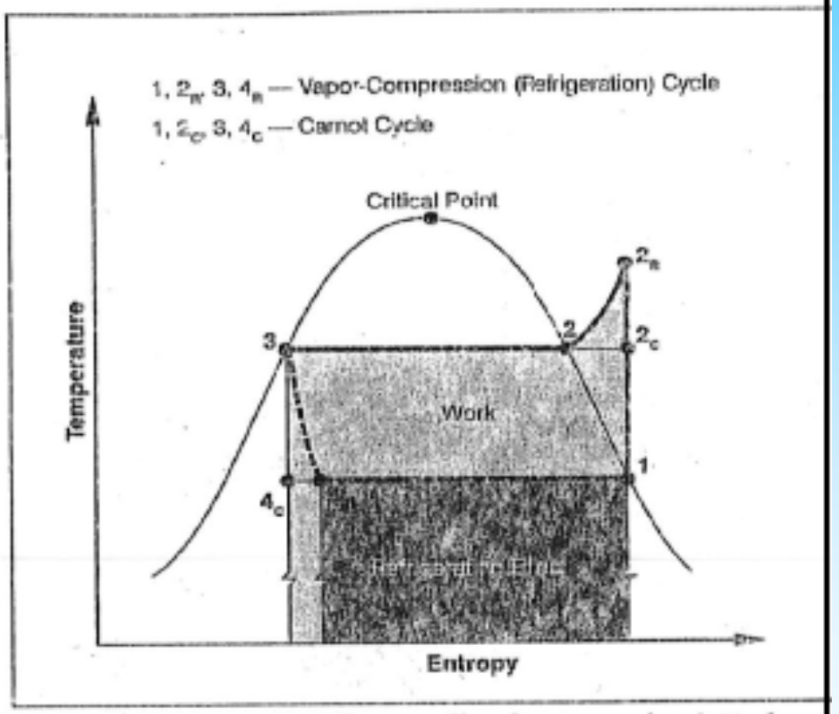


*Figure 1 (left): Temperature-entropy diagram for R-22 and selected replacements (*normalized entropy is plotted as dimensionless ratio to facilitate comparisons). Figure 2 (right): Vapor-compression (refrigeration) cycle on temperature entropy generalized diagram.*