



F-Gas III approved refrigerant replacement solutions

Application		Current Refrigerant	New equipment	
			Low GWP (<750) Interim Solution	Very Low GWP (<150) Long Term Solution
AIR CONDITIONING	Packaged Chiller	• R-134a (1430 - A1) ◆	• R-513A (629 - A1) ◆ • R-515B (288 - A1) ◆	• R-1234ze (1.37 - A2L) ◆ • R-1234yf (0.5 - A2L) ◆
	Packaged Chiller Single split or VRF	• R-410A (2088 - A1) ◆	• R-32 (675 - A2L) ◆ • R-452B (697 - A2L) ◆ • R-454B (465 - A2L) ◆	• R-1234ze (1.37 - A2L) ◆
HEAT PUMPS	Monobloc (outdoors)	• R-410A (2088 - A1) ◆	• R-32 (675 - A2L) ◆ • R-454B (465 - A2L) ◆	• Propane* (R-290) (0.02 - A3) ◆ • R-1234yf (0.5 - A2L) ◆ • R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
	Split systems	• R-410A (2088 - A1) ◆	• R-32 (675 - A2L) ◆ • R-454B (465 - A2L) ◆	• R-1234yf (0.5 - A2L) ◆ • R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
COMMERCIAL REFRIGERATION (Retail)	Multi-compressor >40kW	• R-448A (1386 - A1) ◆ • R-449A (1396 - A1) ◆		• CO ₂ (R-744) (1 - A1) ◆ • R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
	Single compressor or <40kW	• R-448A (1386 - A1) ◆ • R-449A (1396 - A1) ◆	• R-454A (237 - A2L) ◆	• R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
COMMERCIAL REFRIGERATION (Non-retail) & LIGHT INDUSTRIAL	MT Condensing Unit	• R-134a (1430 - A1) ◆	• R-513A (629 - A1) ◆ • R-515B (288 - A1) ◆	• R-1234ze (1.37 - A2L) ◆ • R-1234yf (0.5 - A2L) ◆
	LT Condensing Unit	• R-448A (1386 - A1) ◆ • R-449A (1396 - A1) ◆ • R-407F (1825 - A1) ◆	• R-454A (237 - A2L) ◆	• R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
	Blast Chiller	• R-448A (1386 - A1) ◆ • R-449A (1396 - A1) ◆	• R-454A (237 - A2L) ◆	• R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
	Blast Freezer	• R-448A (1386 - A1) ◆ • R-449A (1396 - A1) ◆ • R-452A (2139 - A1) ◆	• R-454A (237 - A2L) ◆	• R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆ • CO ₂ (R-744) (1 - A1) ◆
INDUSTRIAL	Chiller / Condensing unit / DX System	• R-448A (1386 - A1) ◆ • R-449A (1396 - A1) ◆	• R-454A (237 - A2L) ◆	• R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆ • CO ₂ (R-744) (1 - A1) ◆
	ORC (Organic Rankine Cycle)	• R-134a (1430 - A1) ◆	• R-513A (629 - A1) ◆ • R-515B (288 - A1) ◆	• R-1234ze (1.37 - A2L) ◆ • R-1234yf (0.5 - A2L) ◆
	Flooded system	• R-134a (1430 - A1) ◆	• R-513A (629 - A1) ◆ • R-515B (288 - A1) ◆	• R-1234ze (1.37 - A2L) ◆ • R-1234yf (0.5 - A2L) ◆
	High-temperature heat pump	• Ammonia (R-717) (0 - B2L) ◆ • R-507A (3985 - A1) ◆		• Ammonia (R-717) (0 - B2L) ◆ • R-1234ze (1.37 - A2L) MT Only ◆
	High-temperature heat pump	• R-134a (1430 - A1) ◆		• R-1234ze (1.37 - A2L) ◆ • R-1233zd (3.88 - A1) ◆
	High-temperature heat pump	• Ammonia (R-717) (0 - B2L) ◆ • Propane* (R-290) (0.02 - A3) ◆		• Ammonia (R-717) (0 - B2L) ◆ • Propane* (R-290) (0.02 - A3) ◆
DISTRICT HEATING AND COOLING	District Heating and Cooling	• R-134a (1430 - A1) ◆ • R-507A (3985 - A1) ◆	• R-513A (629 - A1) ◆ • R-515B (288 - A1) ◆	• R-1234ze (1.37 - A2L) ◆ • R-1233zd (3.88 - A1) ◆
AUTOMOTIVE	Automotive Air Conditioning	• R-134a (1430 - A1) ◆	• R-456A (685 - A1) ◆	• R-1234yf (0.5 - A2L) ◆
TRANSPORT	Small	• R-134a (1430 - A1) ◆	• R-513A (629 - A1) ◆	• R-1234yf (0.5 - A2L) ◆
	Large	• R-452A (2139 - A1) ◆	• R-454A (237 - A2L) ◆	• R-454C (146 - A2L) ◆ • R-455A (146 - A2L) ◆
VERY LOW TEMPERATURE (<-50°C)	Medical Storage Freeze Dryers Test Chambers	• R-23 (14800 - A1) ◆ • R-508B (13504 - A1) ◆	Existing and New equipment lowest GWP available • R-473A (1831 - A1) ◆	

GWP values under IPCC 4 & 6 according to F-Gas III / A1 = non flammable / A2L = mildly flammable / A3 = highly flammable / B2L = toxic and mildly flammable.

* heat pump air/water.

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