Honeywell Solstice® Refrigerants

				GWP 5TH IPCC REV	GWP 4TH IPCC REV	ASHRAE CLASS	NEW/ RETROFIT	DROP-IN (1) CAPACITY	DROP-IN (1) EFFICIENCY	COMPRESSOR(2)	COMMENTS	STATUS
CHILLERS, HEAT PUMPS & APPLIANCES	Med/High pressure chillers Heat pumps Appliances	*Baseline*	*R-134a*	*1300*	*1430*	*A1*				*Screw, Centrifugal*		
		Honeywell alternative	**Solstice® N13 (R-450A)**	547	605	A1	New/Retrofit*	8% to 10% lower	1% to 3% higher	Screw, Centrifugal	Wider operating envelope Better at higher ambient	Commercial
		Honeywell alternative	**Solstice® ze (HFO-1234ze)**	<1		A2L	New	20% to 25% lower	1% to 5% higher	Screw, Centrifugal	Wider operating envelope Better at higher ambient Higher oil solubility	Commercial
		Baseline	*R-410A*	*1924*	*2088*	*A1*				*Rotary, Scroll*		
		Honeywell alternative	**Solstice® L41y (R-452B)**	698	698	A2L	New	Similar	1% to 5% higher	Recip., Rotary, Scroll	Works well at higher ambient Lower pressure fluid	Available for sampling
		Honeywell alternative	**Solstice® L40X (R-455A)**	145	148	A2L	New	4% lower LT; similar/higher MT	3% to 6% higher	Recip., Rotary, Scroll	Same discharge temperature in LT	Commercial
	Low pressure chillers	*Baseline*	*R-123*	*79*	*77*	*A1*				*Centrifugal*		
		Honeywell alternative	**Solstice® zd (HFO-1233zd)**	1		A1	New	40% to 45% higher	Similar	Centrifugal	Higher capacity range	Commercial **
	High temperature heat pumps	*Baseline*	*Boilers, fossil fuels, electrical heaters*									
		Honeywell alternative	**Solstice® zd (HFO-1233zd)**	1		A1	New			Screw, others tbd	Industrial processes Depending tre of use***'	Commercial **
		Honeywell alternative	**Solstice® ze (HFO-1234ze)**	<1		A2L	New			Screw, Centrifugal	Wider operating envelope Better at higher ambient Higher oil solubility	Commercial
COMMERCIAL REFRIGERATION	DX	*Baseline*	*R-404A*	*3943*	*3922*	*A1*				*Recip., Scroll, Screw*		
		Honeywell alternative	**Performax LT (R-407F)**	1674	1824	A1	New/Retrofit	Similar	5% to 10% higher	Recip., Scroll, Screw	No TXV change Higher discharge temperature in LT	Commercial
		Honeywell alternative	**Solstice® N40 (R-448A)**	1273	1386	A1	New/Retrofit	Similar	5% to 10% higher	Recip., Scroll, Screw	No TXV change Good compressor envelope coverage	Commercial
	DX Medium Temp CO_2 cascade	*Baseline*	*R-134a*	*1300*	*1430*	*A1*				*Recip., Screw*		
		Honeywell alternative	**Solstice® N13 (R-450A)**	547	605	A1	New/Retrofit*	8% to 10% lower	Similar	Recip., Screw	Wider operating envelope Works well at higher ambient Flooded evaporator possible	Commercial
		Honeywell alternative	**Solstice® ze (HFO-1234ze)**	<1		A2L	New	20% to 25% lower	1% to 5% higher	Recip., Screw	Outdoor/Atex compliance	Commercial
	Self-contained Condensing units	*Baseline*	*R-404A*	*3943*	*3922*	*A1*				*Recip., Rotary, Scroll*		
		Honeywell alternative	**Solstice® L40X (R-455A)**	145	148	A2L	New			Recip., Rotary, Scroll	Same discharge temperature in LT	Commercial
AIR CONDITIONING		*Baseline*	*R-410A*	*1924*	*2088*	*A1*				*Rotary, Scroll*		
		Honeywell alternative	**Solstice® L41y (R-452B)**	698	698	A2L	New	Similar	1% to 3% higher	Recip., Rotary, Scroll, Screw	Works well at higher ambient Lower pressure fluid	Available for sampling
		Honeywell alternative	**Solstice® L40X (R-455A)**	145	148	A2L	New			Recip., Rotary, Scroll	Same discharge temperature in LT	Commercial
		Baseline	*R-407C*	*1624*	*1774*	*A1*				*Recip., Rotary, Scroll*		
		Baseline	*R-22*	*1810*	*1810*	*A1*				*Recip., Rotary, Scroll*		
		Honeywell alternative	**Solstice® L20 (R-444B)**	295	294	A2L	New	vs R-22: 95% vs R-407C: similar	vs R-22: 95% vs R-407C: 1% to 3% higher	Recip., Rotary, Scroll	Works well in warm climates	Available for sampling
TRANSPORT REFRIGERATION	DX	*Baseline*	*R-404A*	*3943*	*3922*	*A1*				*Recip.*		
		Honeywell alternative	**Solstice® L40X (R-455A)**	145	148	A2L	New	4% lower LT; similar/higher MT	3% to 6% higher	Recip., Rotary, Scroll	Same discharge temperature in LT	Commercial
ORC		*Baseline*	*R-134a*	*1300*	*1430*	*A1*						
		Honeywell alternative	**Solstice® ze (HFO-1234ze)**	<1		A2L	New		1% to 5% higher		Depending temperature of use***	Commercial
		Baseline	*R-245fa*	*858*	*1030*	*B1*						
		Honeywell alternative	**Solstice® zd (HFO-1233zd)**	1		A1	New				Depending temperature of use***	Commercial **

(1) Drop-in test in a non-optimised system

(2) Suitable compressor technology, check with Honeywell technical department for qualified models

** Retrofit if original installed capacity is overdimensioned*

*** Ask Honeywell for agreement*

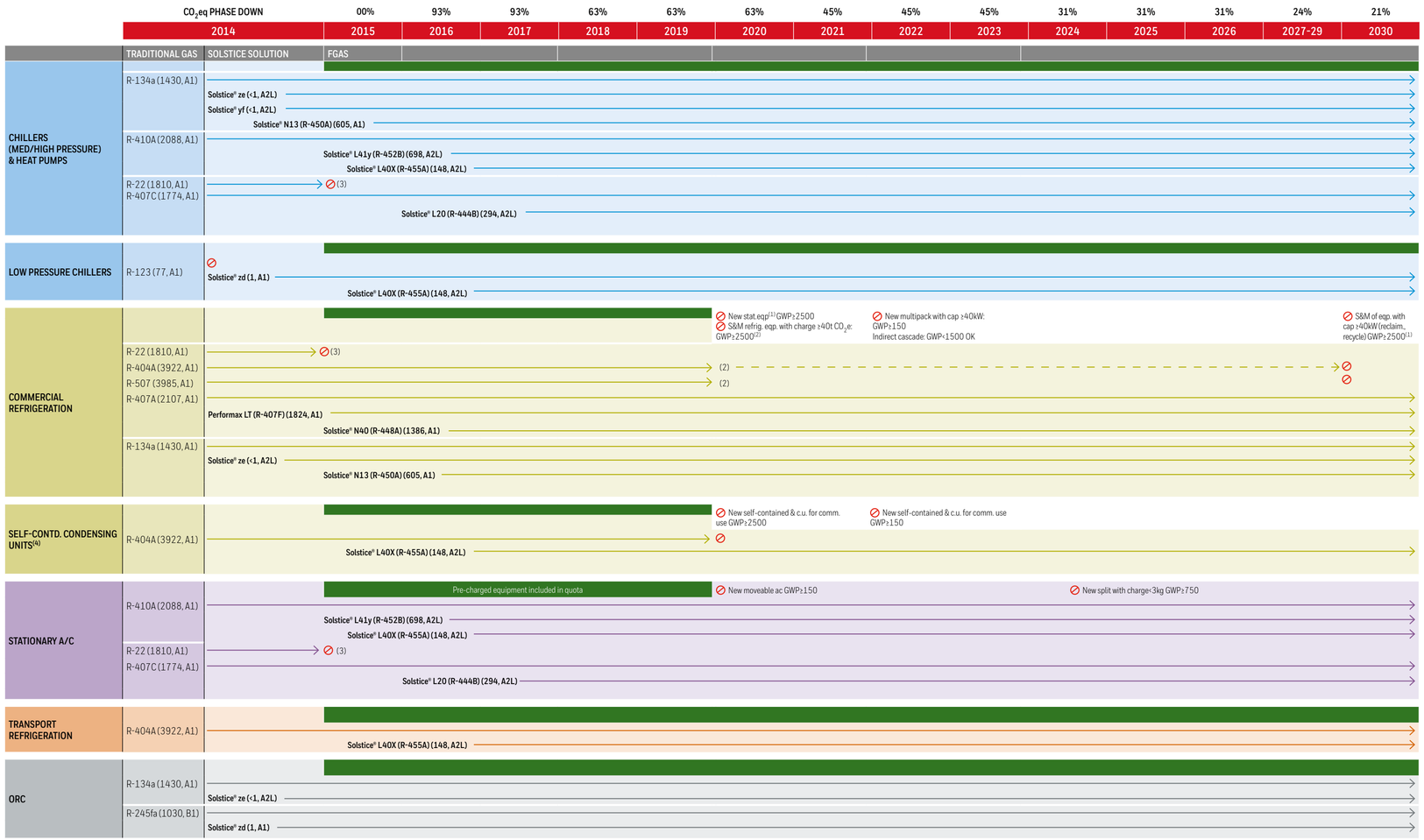
**** Check with Honeywell technical department*

Watch for our new A1, GWP<150 refrigerants under development

Solstice® refrigerants roadmap: The future of refrigerants

The future begins with Honeywell Solstice® Refrigerants

Honeywell



Key

R-134a (1430, A1) Refrigerant (GWP, ASHRAE class)

Fgas: no restrictions during this period on this application

Refrigerant can no longer be used after January 1st of this year

Continue to use but only reclaimed or recycled – not virgin

Notes

S&M	Service and maintenance
GWP values	IPCC revision 4, as per Fgas Regulation, except for Solstice yf/zd/ze (IPCC rev5)
c.u.	condensing units

(1) Except applications at -50°C

(2) Except recycled/reclaimed

(3) Banned in EU28 and Saudi

(4) Please verify if there are charge restrictions

Honeywell is focusing on safer, lower GWP solutions, whilst still maintaining energy efficiency. We have invested in both R&D and manufacturing capacity for continuous innovation to help countries and companies meet the global commitments for carbon footprint reduction.

F-gas – Annex III: new placing on the market prohibitions

PRODUCTS AND EQUIPMENT		DATE OF PROHIBITION
Fire protection equipment that contain HFC-23		1 January 2016
Domestic refrigerators and freezers that contain HFCs [...] with GWP of 150 or more		1 January 2015
Refrigerators and freezers [...] for commercial use (hermetically sealed systems)	that contain HFCs with GWP of 2500 or more	1 January 2020
	that contain HFCs with GWP of 150 or more	1 January 2022
Stationary refrigeration equipment, that contains, or that relies upon for its functioning HFCs with GWP of 2500 or more except equipment intended for application designed to cool products to temperatures below -50°C		1 January 2020
Multipack centralised refrigeration systems for commercial use with a capacity of 40kW or more that contain, or that rely upon for their functioning, fluorinated greenhouse gases with GWP of 150 or more, except in the primary refrigerant circuit of cascade systems where fluorinated greenhouse gases with a GWP of less than 1500 may be used		1 January 2022
Movable room air-conditioning appliances (hermetically sealed equipment which is movable between rooms by the end user) that contain HFCs with GWP of 150 or more		1 January 2020
Single split air-conditioning systems containing less than 3kg of fluorinated greenhouse gases, that contain, or that rely upon for their functioning, fluorinated greenhouse gases with GWP of 750 or more		1 January 2025
Foams that contain HFCs with GWP of 150 or more except when required to meet national safety standards	Extruded polystyrene (XPS)	1 January 2020
	Other foams	1 January 2023
Technical aerosols that contain HFCs with GWP of 150 or more, except when required to meet national safety standards or when used for medical applications		1 January 2018

Note: 'HFCs' refers to blends, not individual components of blends

F-gas – Annex III: control of use

MAINTENANCE AND SERVICING	DATE OF PROHIBITION
Virgin F-gases with GWP>2500 or more for servicing refrigeration equipment with a charge size of 40 tons of CO_2 eq or more. This service ban is not applicable to military and low temp (- 50°C) equipment.	1 January 2020
Recycled and reclaimed F-gases with GWP of 2500 or more for servicing refrigeration equipment with a charge size of 40 tons of CO_2 eq or more.	1 January 2030

PRE-CHARGED EQUIPMENT	DATE OF PROHIBITION
Refrigeration, air conditioning and heat pump equipment pre-charged with F-gases may not be placed on the market unless F-Gases charged into this equipment are accounted for within the quota system referred to in Chapter IV. When placing pre-charged equipment on the market after that date, manufacturers and importers must issue a declaration of conformity which must be verified by an independent auditor.	1 January 2017

Did you know...

- HFOs are not considered fluorinated greenhouse gases: Solstice ze/zd/yf/L40X are not subject to quota nor taxes.
- Using Genetron Performax® LT (R-407F), Solstice® N40 (R-448A) or Solstice N13 (R-450A) after 2022 in an existing refrigeration system placed on the market before 2022 is possible.
- Systems that were placed on the market before 2022 can be retrofitted with R-407F, R-448A and R-450A after 2022.
- There is no end date for R-407F, R-448A and R-450A for service and maintenance.
- Prohibition related to the use of refrigerants with GWP≥150, or GWP≥1500 in indirect cascade systems does not apply to industrial installations where end users cannot access the sale of the product. R-407F, R-448A and R-450A can be used in new industrial installations after 2022.

More information

Find answers to your refrigerants questions with Honeywell Refrigerants suite of apps, calculators, and software:

- Genetron Properties software
- Genetron Performax and Solstice N40 supermarket on line calculators
- PT Chart App and Refrigeration Selection Tool

Available on the App Store

GET IT ON Google play

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