

Refrigerants.

Product data summary.



Product information

Type	Product R-Number	Other Common Names	ODP ¹	GWP ²	Boiling Point ³ @ 1atm (°C)	Critical Temp ³ Tc (°C)	Critical Pressure ³ (bara)	ASHRAE Safety Group	Compatible Oils	Retrofit replacement for
HCFC	22		0.055	1810	-41	96	50	A1	MO,AB	
	123		0.060	77	28	184	37	B1	MO	R11, R113
	401A	Suva [®] MP39	0.033	1182	-33	107	46	A1	MO, AB	R12
	401B	Suva [®] MP66	0.036	1288	-35	106	47	A1	MO, AB	R12
	402A	HP80	0.019	2788	-49	76	42	A1	MO, AB	R502
	402B	HP81	0.030	2416	-47	83	45	A1	MO, AB	R502
	408A	Forane [®] FX10	0.024	3152	-44	83	43	A1	MO, AB, POE	R502
	409A	Forane [®] FX56	0.046	1909	-34	107	45	A1	MO, AB, POE	R12
HFC	23		0	14800	-80	26	48	A1	POE	R13
	32		0	675	-52	78	58	A2	POE	
	134a		0	1430	-26	101	41	A1	PAG-Auto, POE	R12*, R22*
	404A	Suva [®] HP62	0	3922	-47	72	37	A1	POE	R22*, R502*
	407A	Klea [®] 60	0	2107	-46	82	45	A1	POE	R22*, R404A
	407C	Suva [®] 9000	0	1774	-44	86	46	A1	POE	R22*
	407F	Performax [™] LT	0	1825	-46	83	48	A1	POE	R22*, R404A
	410A	Genetron [®] AZ-20	0	2088	-51	71	49	A1	POE	R13B1*
	417A	ISCEON [®] M059	0	2346	-39	87	40	A1	MO, AB, POE	R22
	422A	ISCEON [®] M079	0	3143	-47	72	37	A1	MO, AB, POE	R22, R502, HCFC blends
	422D	ISCEON [®] M029 [™]	0	2729	-43	80	39	A1	MO, AB, POE	R22
	423A	ISCEON [®] 39TC [®]	0	2280	-24	100	36	A1	POE	R12
	424A	RS-44	0	2440	-39	86	40	A1	MO, AB, POE	R22
	427A	Forane [®] FX100	0	2138	-43	85	44	A1	MO, AB, POE	R22*
	428A	RS-52	0	3607	-47	69	37	A1	MO, AB, POE	R22, R502, HCFC blends
	434A	RS-45	0	3245	-45	75	38	A1	MO, AB, POE	R22
	437A	ISCEON [®] M049Plus [™]	0	1805	-29	96	41	A1	MO, AB, POE	R12, HCFC blends
	438A	ISCEON [®] M099 [™]	0	2265	-42	85	43	A1	MO, AB, POE	R22
	442A	RS-50	0	1888	-47	82	48	A1	POE	R404A, R507A
	507A	Genetron [®] AZ-50	0	3985	-47	71	37	A1	POE	R502*, R22*
508B	Suva [®] 95	0	13396	-88	11	38	A1	POE	R503*, R13*	
M089	ISCEON [®] M089	0	3805	-53	64	36	TBC (A1)	MO, AB, POE	R13B1	
HFO	1234yf	Opteon [®] YF, Solstice [™] yf	0	4	-29	95	34	A2	PAG-Auto, POE	
	1234ze	Solstice [™] ze	0	6	-19	109	36	A2	POE	
Natural /not in kind	170	Ethane	0	6	-89	32	49	A3	MO, AB, POE	
	290	Propane, CARE [®] 40	0	3	-42	97	43	A3	MO, AB, POE	
	600a	Isobutane, CARE [®] 10	0	3	-12	135	36	A3	MO, AB, POE	
	717	Ammonia	0	0	-33	132	113	B2	Consult OEM	
	744	Carbon Dioxide	0	1	-57	31	74	A1	Consult OEM	
	1150	Ethylene, Ethene	0	4	-104	9.2	50	A3	MO, AB, POE	
	1270	Propylene, Propene, CARE [®] 45	0	2	-48	91	46	A3	MO, AB, POE	

*When carrying out a retrofit replacement, an oil change will be necessary. For more details see retrofit information.

1 Ozone Depletion Potential, UNEP (2006). R11 = 1

2 Global Warming Potential (100 year), IPCC 4th Assessment Report, 2007. CO₂ = 1

Common applications

Type	Product R-Number	Refrigeration				Air Conditioning		Centrifugal chillers	Mobile
		V.low temp	Low temp	Med temp	High temp	Residential & Light	DX Chillers		
HCFC	22		✓ (2-stage)	✓	✓	✓	✓	✓	
	123							✓	
	401A			✓	✓	✓	✓		
	401B		(✓)	✓					
	402A		✓	(✓)					
	402B		✓	✓					
	408A		(✓)	✓					
	409A			✓	✓	✓	(✓)	✓	
HFC	23	✓							
	32		✓			✓			
	134a			✓	✓	✓	✓	✓	✓
	404A		✓	✓					
	407A		✓	✓					
	407C		(✓)	✓	(✓)	✓	✓		
	407F		✓	✓					
	410A	✓ (2-stage)	✓	✓		✓	✓	(✓)	
	417A			✓		✓	✓		
	422A		✓	✓					
	422D		(✓)	✓	(✓)	✓	✓		
	423A							✓	
	424A			✓	✓	✓	✓		
	427A		(✓)	✓	✓	✓	✓		
	428A		✓						
	434A			✓	✓		✓		
	437A			✓	✓	✓	✓		✓
	438A		(✓)	✓	(✓)	✓	✓		
	442A		✓	✓					
	507A		✓	✓				(✓)	
508B	✓								
M089	✓								
HFO	1234yf			✓	✓	✓	✓		✓
	1234ze			✓	✓	✓	✓		✓
Natural/not in kind	170	✓							
	290		✓	✓	✓	✓	✓		
	600a			✓	✓				
	717		✓	✓	(✓)		✓	✓	
	744		✓	✓	(✓)		✓	✓	✓
	1150	✓							
	1270		✓	✓	(✓)				

Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

Linde – ideas become solutions.



Linde AG

Linde Gases Division, Seitnerstrasse 70, 82049 Pullach, Germany
Phone +49.89.7446-2399, Fax +49.89.7446-2071, www.linde-gas.com/refrigerants

Genetron®, Performax™ and Solstice™ are trademarks of Honeywell International Inc, Suva®, ISCEON® and Opteon® are registered trademarks of E. I. du Pont de Nemours and Company, Klea® is a registered trademark of Mexichem, Forane® is a registered trademark of Arkema and CARE® is a registered trademark of The Linde Group. All data is provided without a warranty of any kind.